

# SEQUENCE LISTING

<110> Yu, Xuanchuan  
Miranda, Miracar  
Turner, C. Alexander Jr.

<120> Novel Human Protocadherin Proteins and Polynucleotides Encoding the Same

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<150> US 60/257,257

<151> 2000-12-20

<160> 8

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| Met | Asp | Ile | Ile | Met | Gly | His | Cys | Val | Gly | Thr | Arg | Pro | Pro | Ala | Cys |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |     |
| Cys | Leu | Ile | Leu | Leu | Phe | Lys | Leu | Leu | Ala | Thr | Val | Ser | Gln | Gly |     |
|     |     | 20  |     |     |     |     | 25  |     |     |     | 30  |     |     |     |     |
| Leu | Pro | Gly | Thr | Gly | Pro | Leu | Gly | Phe | His | Phe | Thr | His | Ser | Ile | Tyr |
|     |     | 35  |     |     |     | 40  |     |     |     |     | 45  |     |     |     |     |
| Asn | Ala | Thr | Val | Tyr | Glu | Asn | Ser | Ala | Ala | Arg | Thr | Tyr | Val | Asn | Ser |
|     | 50  |     |     |     |     | 55  |     |     |     | 60  |     |     |     |     |     |
| Gln | Ser | Arg | Met | Gly | Ile | Thr | Leu | Ile | Asp | Leu | Ser | Trp | Asp | Ile | Lys |
| 65  |     |     |     | 70  |     |     |     |     | 75  |     |     |     | 80  |     |     |
| Tyr | Arg | Ile | Val | Ser | Gly | Asp | Glu | Glu | Gly | Phe | Phe | Lys | Ala | Glu | Glu |
|     |     |     | 85  |     |     |     | 90  |     |     |     |     | 95  |     |     |     |
| Val | Ile | Ile | Ala | Asp | Phe | Cys | Phe | Leu | Arg | Ile | Arg | Thr | Lys | Gly | Gly |
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|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Val | Lys | Gly | Ser | Val | Arg | Gly | Glu | Asp | Leu | Glu | Ala | Trp | Thr | Lys | Val |
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| Val | Ala | Gln | Val | Thr | Ala | Thr | Asp | Ala | Asp | Ile | Gly | Ser | Asn | Gly | Glu |
|     |     |     | 180 |     |     |     |     | 185 |     |     |     |     | 190 |     |     |
| Phe | Tyr | Tyr | Tyr | Phe | Lys | Asn | Lys | Val | Asp | Leu | Phe | Ser | Val | His | Pro |
|     |     |     | 195 |     |     |     | 200 |     |     |     |     | 205 |     |     |     |
| Thr | Ser | Gly | Val | Ile | Ser | Leu | Ser | Gly | Arg | Leu | Asn | Tyr | Asp | Glu | Lys |
|     | 210 |     |     |     |     | 215 |     |     |     |     | 220 |     |     |     |     |
| Asn | Arg | Tyr | Asp | Leu | Glu | Ile | Leu | Ala | Val | Asp | Arg | Gly | Met | Lys | Leu |
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| Tyr | Gly | Asn | Asn | Gly | Val | Ser | Ser | Thr | Ala | Lys | Leu | Tyr | Val | His | Ile |
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|     | 290 |     |     |     |     | 295 |     |     |     |     | 300 |     |     |     |     |
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|     |     |     |     | 325 |     |     |     |     | 330 |     |     |     |     | 335 |     |
| Phe | Pro | Tyr | Gly | Tyr | Asn | Leu | Thr | Leu | Gln | Ala | Lys | Asp | Lys | Gly | Ser |
|     |     |     | 340 |     |     |     |     | 345 |     |     |     |     | 350 |     |     |
| Pro | Gln | Lys | Cys | Ser | Ala | Leu | Lys | Ala | Val | Tyr | Ile | Gly | Asn | Pro | Thr |
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| Ile | Ser | Glu | Phe | Ser | Pro | Pro | Gly | Val | Val | Val | Ala | Ile | Val | Lys | Leu |
| 385 |     |     |     |     | 390 |     |     |     |     | 395 |     |     |     |     | 400 |
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| Ala | Val | Tyr | Phe | Lys | Ile | Asn | Pro | Arg | Ser | Gly | Leu | Ile | Val | Thr | Ala |
|     |     |     | 420 |     |     |     |     | 425 |     |     |     |     | 430 |     |     |
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|     | 435 |     |     |     |     |     | 440 |     |     |     |     | 445 |     |     |     |
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|     | 450 |     |     |     |     | 455 |     |     |     |     | 460 |     |     |     |     |
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|     |      |     |     |     |     |      |      |     |     |     |     |      |     |     |     |
|-----|------|-----|-----|-----|-----|------|------|-----|-----|-----|-----|------|-----|-----|-----|
| Leu | Phe  | Glu | Lys | Val | Ala | Cys  | Gln  | Gly | Val | Ile | Ser | Tyr  | Asp | Phe | Pro |
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| Val | Gly  | Gly | His | Ile | Thr | Ala  | Val  | Ser | Ala | Ile | Asp | Ile  | Asp | Glu | Leu |
|     |      | 595 |     |     |     |      | 600  |     |     |     |     | 605  |     |     |     |
| Glu | Leu  | Val | Lys | Tyr | Lys | Ile  | Ile  | Ser | Gly | Asn | Glu | Leu  | Gly | Phe | Phe |
|     | 610  |     |     |     |     | 615  |      |     |     |     | 620 |      |     |     |     |
| Tyr | Leu  | Asn | Pro | Asp | Ser | Gly  | Val  | Leu | Gln | Leu | Lys | Lys  | Ser | Leu | Thr |
| 625 |      |     |     |     | 630 |      |      |     |     | 635 |     |      |     |     | 640 |
| Asn | Ser  | Gly | Ile | Lys | Asn | Gly  | Asn  | Phe | Ala | Leu | Arg | Ile  | Thr | Ala | Thr |
|     |      |     | 645 |     |     |      |      |     | 650 |     |     |      |     | 655 |     |
| Asp | Gly  | Glu | Asn | Leu | Ala | Asp  | Pro  | Met | Ser | Ile | Asn | Ile  | Ser | Val | Leu |
|     |      |     | 660 |     |     |      |      | 665 |     |     |     |      | 670 |     |     |
| His | Gly  | Lys | Val | Ser | Ser | Lys  | Ser  | Phe | Ser | Cys | Arg | Glu  | Thr | Arg | Val |
|     |      | 675 |     |     |     |      | 680  |     |     |     |     | 685  |     |     |     |
| Ala | Gln  | Lys | Leu | Ala | Glu | Lys  | Leu  | Leu | Ile | Lys | Ala | Lys  | Ala | Asn | Gly |
|     |      | 690 |     |     |     | 695  |      |     |     |     | 700 |      |     |     |     |
| Lys | Leu  | Asn | Leu | Glu | Asp | Gly  | Phe  | Leu | Asp | Phe | Tyr | Ser  | Ile | Asn | Arg |
| 705 |      |     |     |     | 710 |      |      |     |     | 715 |     |      |     |     | 720 |
| Gln | Gly  | Pro | Tyr | Phe | Asp | Lys  | Ser  | Phe | Pro | Ser | Asp | Val  | Ala | Val | Lys |
|     |      |     |     | 725 |     |      |      |     | 730 |     |     |      |     | 735 |     |
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|     |      |     | 740 |     |     |      |      | 745 |     |     |     |      | 750 |     |     |
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|     |      | 755 |     |     |     |      | 760  |     |     |     |     | 765  |     |     |     |
| Asn | Thr  | Asp | Ser | Cys | Phe | Asn  | Ile  | Asp | Met | Glu | Thr | Gly  | Gln | Leu | Lys |
|     | 770  |     |     |     |     | 775  |      |     |     |     | 780 |      |     |     |     |
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| Leu | Thr  | Ile | Asn | Val | Glu | Asp  | Ala  | Asn | Asp | Asn | Ser | Pro  | Val | Phe | Ile |
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| Gln | Asp  | Ser | Tyr | Ser | Val | Asn  | Ile  | Leu | Glu | Ser | Ser | Gly  | Ile | Gly | Thr |
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| His | Asp  | Pro | Asp | Leu | Gly | Leu  | Gly  | Gly | Gln | Val | Arg | Tyr  | Ser | Leu | Val |
|     |      |     |     | 965 |     |      |      |     | 970 |     |     |      |     | 975 |     |
| Asn | Asp  | Tyr | Asn | Gly | Arg | Phe  | Glu  | Ile | Asp | Lys | Ala | Ser  | Gly | Ala | Ile |
|     |      |     | 980 |     |     |      |      | 985 |     |     |     |      | 990 |     |     |
| Arg | Leu  | Ser | Lys | Glu | Leu | Asp  | Tyr  | Glu | Lys | Gln | Gln | Phe  | Tyr | Asn | Leu |
|     |      | 995 |     |     |     |      | 1000 |     |     |     |     | 1005 |     |     |     |
| Thr | Val  | Arg | Ala | Lys | Asp | Lys  | Gly  | Arg | Pro | Val | Ser | Leu  | Ser | Ser | Val |
|     | 1010 |     |     |     |     | 1015 |      |     |     |     |     | 1020 |     |     |     |

|   |      |      |      |      |
|---|------|------|------|------|
| Ser Phe Val Glu Val Glu Val Val Asp Val Asn Glu Asn Leu His Thr | 1025 | 1030 | 1035 | 1040 |
| Pro Tyr Phe Pro Asp Phe Ala Val Val Gly Ser Val Lys Glu Asn Ser |      | 1045 | 1050 | 1055 |
| Arg Ile Gly Thr Ser Val Leu Gln Val Thr Ala Arg Asp Glu Asp Ser | 1060 |      | 1065 | 1070 |
| Gly Arg Asp Gly Glu Ile Gln Tyr Ser Ile Arg Asp Gly Ser Gly Leu | 1075 | 1080 |      | 1085 |
| Gly Arg Phe Ser Ile Asp Asp Glu Ser Gly Val Ile Thr Ala Ala Asp | 1090 | 1095 | 1100 |      |
| Ile Leu Asp Arg Glu Thr Met Gly Ser Tyr Trp Leu Thr Val Tyr Ala | 1105 | 1110 | 1115 | 1120 |
| Thr Asp Arg Gly Val Val Pro Leu Tyr Ser Thr Ile Glu Val Tyr Ile |      | 1125 | 1130 | 1135 |
| Glu Val Glu Asp Val Asn Asp Asn Ala Pro Leu Thr Ser Glu Pro Ile | 1140 |      | 1145 | 1150 |
| Tyr Tyr Pro Val Val Met Glu Asn Ser Pro Lys Asp Val Ser Val Ile | 1155 | 1160 |      | 1165 |
| Gln Ile Gln Ala Glu Asp Pro Asp Ser Ser Ser Asn Glu Lys Leu Thr | 1170 | 1175 | 1180 |      |
| Tyr Arg Ile Thr Ser Gly Asn Pro Gln Asn Phe Phe Ala Ile Asn Ile | 1185 | 1190 | 1195 | 1200 |
| Lys Thr Gly Leu Ile Thr Thr Thr Ser Arg Lys Leu Asp Arg Glu Gln |      | 1205 | 1210 | 1215 |
| Gln Ala Glu His Phe Leu Glu Val Thr Val Thr Asp Gly Gly Pro Ser | 1220 |      | 1225 | 1230 |
| Pro Lys Gln Ser Thr Ile Trp Val Val Val Gln Val Leu Asp Glu Asn | 1235 | 1240 |      | 1245 |
| Asp Asn Lys Pro Gln Phe Pro Glu Lys Val Tyr Gln Ile Lys Leu Pro | 1250 | 1255 | 1260 |      |
| Glu Arg Asp Arg Lys Lys Arg Gly Glu Pro Ile Tyr Arg Ala Phe Ala | 1265 | 1270 | 1275 | 1280 |
| Phe Asp Arg Asp Glu Gly Pro Asn Ala Glu Ile Ser Tyr Ser Ile Val |      | 1285 | 1290 | 1295 |
| Asp Gly Asn Asp Asp Gly Lys Phe Phe Ile Asp Pro Lys Thr Gly Met | 1300 |      | 1305 | 1310 |
| Val Ser Ser Arg Lys Gln Phe Thr Ala Gly Ser Tyr Asp Ile Leu Thr | 1315 | 1320 |      | 1325 |
| Ile Lys Ala Val Asp Asn Gly Arg Pro Gln Lys Ser Ser Thr Ala Arg | 1330 | 1335 | 1340 |      |
| Leu His Ile Glu Trp Ile Lys Lys Pro Pro Pro Ser Pro Ile Pro Leu | 1345 | 1350 | 1355 | 1360 |
| Thr Phe Asp Glu Pro Phe Tyr Asn Phe Thr Val Met Glu Ser Asp Arg |      | 1365 | 1370 | 1375 |
| Val Thr Glu Ile Val Gly Val Val Ser Val Gln Pro Ala Asn Thr Pro | 1380 |      | 1385 | 1390 |
| Leu Trp Phe Asp Ile Val Gly Gly Asn Phe Asp Ser Ala Phe Asp Ala | 1395 | 1400 |      | 1405 |
| Glu Lys Gly Val Gly Thr Ile Val Ile Ala Lys Pro Leu Asp Ala Glu | 1410 | 1415 | 1420 |      |
| Gln Arg Ser Ile Tyr Asn Met Ser Val Glu Val Thr Asp Gly Thr Asn | 1425 | 1430 | 1435 | 1440 |
| Val Ala Val Thr Gln Val Phe Ile Lys Val Leu Asp Asn Asn Asp Asn |      | 1445 | 1450 | 1455 |
| Gly Pro Glu Phe Ser Gln Pro Asn Tyr Asp Val Thr Ile Ser Glu Asp | 1460 |      | 1465 | 1470 |



|      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |  |
|------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|--|
| Val  | Leu | Pro  | Asp  | Thr  | Glu  | Ile  | Leu  | Gln  | Ile  | Glu  | Ala  | Thr  | Asp  | Arg  | Asp  |  |  |
|      |     | 1475 |      |      |      |      | 1480 |      |      |      |      |      | 1485 |      |      |  |  |
| Glu  | Lys | His  | Lys  | Leu  | Ser  | Tyr  | Thr  | Val  | His  | Ser  | Ser  | Ile  | Asp  | Ser  | Ile  |  |  |
|      |     | 1490 |      |      |      | 1495 |      |      |      |      |      | 1500 |      |      |      |  |  |
| Ser  | Met | Arg  | Lys  | Phe  | Arg  | Ile  | Asp  | Pro  | Ser  | Thr  | Gly  | Val  | Leu  | Tyr  | Thr  |  |  |
| 1505 |     |      |      |      | 1510 |      |      |      |      |      | 1515 |      |      |      | 1520 |  |  |
| Ala  | Glu | Arg  | Leu  | Asp  | His  | Glu  | Ala  | Gln  | Asp  | Lys  | His  | Ile  | Leu  | Asn  | Ile  |  |  |
|      |     |      |      | 1525 |      |      |      |      |      | 1530 |      |      |      |      | 1535 |  |  |
| Met  | Val | Arg  | Asp  | Gln  | Glu  | Phe  | Pro  | Tyr  | Arg  | Arg  | Asn  | Leu  | Ala  | Arg  | Val  |  |  |
|      |     |      | 1540 |      |      |      |      | 1545 |      |      |      |      | 1550 |      |      |  |  |
| Ile  | Val | Asn  | Val  | Glu  | Asp  | Ala  | Asn  | Asp  | His  | Ser  | Pro  | Tyr  | Phe  | Thr  | Asn  |  |  |
|      |     | 1555 |      |      |      |      | 1560 |      |      |      |      |      | 1565 |      |      |  |  |
| Pro  | Leu | Tyr  | Glu  | Ala  | Ser  | Val  | Phe  | Glu  | Ser  | Ala  | Ala  | Leu  | Gly  | Ser  | Ala  |  |  |
|      |     | 1570 |      |      |      | 1575 |      |      |      |      | 1580 |      |      |      |      |  |  |
| Val  | Leu | Gln  | Val  | Thr  | Ala  | Leu  | Asp  | Lys  | Asp  | Lys  | Gly  | Glu  | Asn  | Ala  | Glu  |  |  |
| 1585 |     |      |      |      | 1590 |      |      |      |      |      | 1595 |      |      |      | 1600 |  |  |
| Leu  | Ile | Tyr  | Thr  | Ile  | Glu  | Ala  | Gly  | Asn  | Thr  | Gly  | Asn  | Met  | Phe  | Lys  | Ile  |  |  |
|      |     |      |      | 1605 |      |      |      |      | 1610 |      |      |      |      | 1615 |      |  |  |
| Glu  | Pro | Val  | Leu  | Gly  | Ile  | Ile  | Thr  | Ile  | Cys  | Lys  | Glu  | Pro  | Asp  | Met  | Thr  |  |  |
|      |     | 1620 |      |      |      |      | 1625 |      |      |      |      |      | 1630 |      |      |  |  |
| Thr  | Met | Gly  | Gln  | Phe  | Val  | Leu  | Ser  | Ile  | Lys  | Val  | Thr  | Asp  | Gln  | Gly  | Ser  |  |  |
|      |     | 1635 |      |      |      | 1640 |      |      |      |      |      | 1645 |      |      |      |  |  |
| Pro  | Pro | Met  | Ser  | Ala  | Thr  | Ala  | Ile  | Val  | Arg  | Ile  | Ser  | Val  | Thr  | Met  | Ser  |  |  |
|      |     | 1650 |      |      |      | 1655 |      |      |      |      |      | 1660 |      |      |      |  |  |
| Asp  | Asn | Ser  | His  | Pro  | Lys  | Phe  | Ile  | His  | Lys  | Asp  | Tyr  | Gln  | Ala  | Glu  | Val  |  |  |
| 1665 |     |      |      | 1670 |      |      |      |      |      | 1675 |      |      |      |      | 1680 |  |  |
| Asn  | Glu | Asn  | Val  | Asp  | Ile  | Gly  | Thr  | Ser  | Val  | Ile  | Leu  | Ile  | Ser  | Ala  | Ile  |  |  |
|      |     |      |      | 1685 |      |      |      |      | 1690 |      |      |      |      | 1695 |      |  |  |
| Ser  | Gln | Ser  | Thr  | Leu  | Ile  | Tyr  | Glu  | Val  | Lys  | Asp  | Gly  | Asp  | Ile  | Asn  | Gly  |  |  |
|      |     |      | 1700 |      |      |      | 1705 |      |      |      |      |      | 1710 |      |      |  |  |
| Ile  | Phe | Thr  | Ile  | Asn  | Pro  | Tyr  | Ser  | Gly  | Val  | Ile  | Thr  | Thr  | Gln  | Lys  | Ala  |  |  |
|      |     | 1715 |      |      |      | 1720 |      |      |      |      |      | 1725 |      |      |      |  |  |
| Leu  | Asp | Tyr  | Glu  | Arg  | Thr  | Ser  | Ser  | Tyr  | Gln  | Leu  | Ile  | Ile  | Gln  | Ala  | Thr  |  |  |
|      |     | 1730 |      |      |      | 1735 |      |      |      |      | 1740 |      |      |      |      |  |  |
| Asn  | Met | Ala  | Gly  | Met  | Ala  | Ser  | Asn  | Ala  | Thr  | Val  | Asn  | Ile  | Gln  | Ile  | Val  |  |  |
| 1745 |     |      |      | 1750 |      |      |      |      |      | 1755 |      |      |      | 1760 |      |  |  |
| Asp  | Glu | Asn  | Asp  | Asn  | Ala  | Pro  | Val  | Phe  | Leu  | Phe  | Ser  | Gln  | Tyr  | Ser  | Gly  |  |  |
|      |     |      |      | 1765 |      |      |      |      | 1770 |      |      |      | 1775 |      |      |  |  |
| Ser  | Leu | Ser  | Glu  | Ala  | Ala  | Pro  | Ile  | Asn  | Ser  | Ile  | Val  | Arg  | Ser  | Leu  | Asp  |  |  |
|      |     | 1780 |      |      |      |      | 1785 |      |      |      |      | 1790 |      |      |      |  |  |
| Asn  | Ser | Pro  | Leu  | Val  | Ile  | Arg  | Ala  | Thr  | Asp  | Ala  | Asp  | Ser  | Asn  | Arg  | Asn  |  |  |
|      |     | 1795 |      |      |      | 1800 |      |      |      |      |      | 1805 |      |      |      |  |  |
| Ala  | Leu | Leu  | Val  | Tyr  | Gln  | Ile  | Val  | Glu  | Ser  | Thr  | Ala  | Lys  | Lys  | Phe  | Phe  |  |  |
|      |     | 1810 |      |      |      | 1815 |      |      |      |      | 1820 |      |      |      |      |  |  |
| Thr  | Val | Asp  | Ser  | Ser  | Thr  | Gly  | Ala  | Ile  | Arg  | Thr  | Ile  | Ala  | Asn  | Leu  | Asp  |  |  |
| 1825 |     |      |      |      | 1830 |      |      |      |      | 1835 |      |      |      | 1840 |      |  |  |
| His  | Glu | Thr  | Ile  | Ala  | His  | Phe  | His  | Phe  | His  | Val  | His  | Val  | Arg  | Asp  | Ser  |  |  |
|      |     |      |      | 1845 |      |      |      |      | 1850 |      |      |      |      | 1855 |      |  |  |
| Gly  | Ser | Pro  | Gln  | Leu  | Thr  | Ala  | Glu  | Ser  | Pro  | Val  | Glu  | Val  | Asn  | Ile  | Glu  |  |  |
|      |     |      | 1860 |      |      |      | 1865 |      |      |      |      |      | 1870 |      |      |  |  |
| Val  | Thr | Asp  | Val  | Asn  | Asp  | Asn  | Pro  | Pro  | Val  | Phe  | Thr  | Gln  | Ala  | Val  | Phe  |  |  |
|      |     | 1875 |      |      |      |      | 1880 |      |      |      |      | 1885 |      |      |      |  |  |
| Glu  | Thr | Ile  | Leu  | Leu  | Leu  | Pro  | Thr  | Tyr  | Val  | Gly  | Val  | Glu  | Val  | Leu  | Lys  |  |  |
|      |     | 1890 |      |      |      | 1895 |      |      |      |      | 1900 |      |      |      |      |  |  |
| Val  | Ser | Ala  | Thr  | Asp  | Pro  | Asp  | Ser  | Glu  | Val  | Pro  | Pro  | Glu  | Leu  | Thr  | Tyr  |  |  |
| 1905 |     |      |      |      | 1910 |      |      |      |      | 1915 |      |      |      |      | 1920 |  |  |

|      |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |  |
|------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|--|
| Ser  | Leu | Met  | Glu  | Gly  | Ser  | Leu  | Asp  | His  | Phe  | Leu  | Ile  | Asp  | Ser  | Asn  | Ser  |  |  |
|      |     |      |      | 1925 |      |      |      |      | 1930 |      |      |      |      |      | 1935 |  |  |
| Gly  | Val | Leu  | Thr  | Ile  | Lys  | Asn  | Asn  | Asn  | Leu  | Ser  | Lys  | Asp  | His  | Tyr  | Met  |  |  |
|      |     |      | 1940 |      |      |      |      | 1945 |      |      |      |      |      | 1950 |      |  |  |
| Leu  | Ile | Val  | Lys  | Val  | Ser  | Asp  | Gly  | Lys  | Phe  | Tyr  | Ser  | Thr  | Ser  | Met  | Val  |  |  |
|      |     | 1955 |      |      |      |      | 1960 |      |      |      |      |      |      | 1965 |      |  |  |
| Thr  | Ile | Met  | Val  | Lys  | Glu  | Ala  | Met  | Asp  | Ser  | Gly  | Leu  | His  | Phe  | Thr  | Gln  |  |  |
|      |     | 1970 |      |      |      |      | 1975 |      |      |      |      |      |      | 1980 |      |  |  |
| Ser  | Phe | Tyr  | Ser  | Thr  | Ser  | Ile  | Ser  | Glu  | Asn  | Asn  | Thr  | Asn  | Ile  | Thr  | Lys  |  |  |
| 1985 |     |      |      |      | 1990 |      |      |      |      |      | 1995 |      |      |      | 2000 |  |  |
| Val  | Ala | Ile  | Val  | Asn  | Ala  | Val  | Gly  | Asn  | Arg  | Leu  | Asn  | Glu  | Pro  | Leu  | Lys  |  |  |
|      |     |      |      | 2005 |      |      |      |      | 2010 |      |      |      |      |      | 2015 |  |  |
| Tyr  | Ser | Ile  | Leu  | Asn  | Pro  | Gly  | Asn  | Lys  | Phe  | Lys  | Ile  | Lys  | Ser  | Thr  | Ser  |  |  |
|      |     |      | 2020 |      |      |      |      | 2025 |      |      |      |      |      | 2030 |      |  |  |
| Gly  | Val | Ile  | Gln  | Thr  | Thr  | Gly  | Val  | Pro  | Phe  | Asp  | Arg  | Glu  | Glu  | Gln  | Glu  |  |  |
|      |     |      | 2035 |      |      |      | 2040 |      |      |      |      |      |      | 2045 |      |  |  |
| Leu  | Tyr | Glu  | Leu  | Val  | Val  | Glu  | Ala  | Ser  | Arg  | Glu  | Leu  | Asp  | His  | Leu  | Arg  |  |  |
|      |     | 2050 |      |      |      |      | 2055 |      |      |      |      | 2060 |      |      |      |  |  |
| Val  | Ala | Arg  | Val  | Val  | Val  | Arg  | Val  | Asn  | Ile  | Glu  | Asp  | Ile  | Asn  | Asp  | Asn  |  |  |
| 2065 |     |      |      |      |      | 2070 |      |      |      |      | 2075 |      |      |      | 2080 |  |  |
| Ser  | Pro | Val  | Phe  | Val  | Gly  | Leu  | Pro  | Tyr  | Tyr  | Ala  | Ala  | Val  | Gln  | Val  | Asp  |  |  |
|      |     |      |      | 2085 |      |      |      |      | 2090 |      |      |      |      | 2095 |      |  |  |
| Ala  | Glu | Pro  | Gly  | Thr  | Leu  | Ile  | Tyr  | Gln  | Val  | Thr  | Ala  | Ile  | Asp  | Lys  | Asp  |  |  |
|      |     |      | 2100 |      |      |      |      | 2105 |      |      |      |      |      | 2110 |      |  |  |
| Lys  | Gly | Pro  | Asn  | Gly  | Glu  | Val  | Thr  | Tyr  | Val  | Leu  | Gln  | Asp  | Asp  | Tyr  | Gly  |  |  |
|      |     | 2115 |      |      |      |      | 2120 |      |      |      |      |      | 2125 |      |      |  |  |
| His  | Phe | Glu  | Ile  | Asn  | Pro  | Asn  | Ser  | Gly  | Asn  | Val  | Ile  | Leu  | Lys  | Glu  | Ala  |  |  |
|      |     | 2130 |      |      |      |      | 2135 |      |      |      |      | 2140 |      |      |      |  |  |
| Phe  | Asn | Ser  | Asp  | Leu  | Ser  | Asn  | Ile  | Glu  | Tyr  | Gly  | Val  | Thr  | Ile  | Leu  | Ala  |  |  |
| 2145 |     |      |      |      | 2150 |      |      |      |      |      | 2155 |      |      |      | 2160 |  |  |
| Lys  | Asp | Gly  | Gly  | Lys  | Pro  | Ser  | Leu  | Ser  | Thr  | Ser  | Val  | Glu  | Leu  | Pro  | Ile  |  |  |
|      |     |      |      | 2165 |      |      |      |      | 2170 |      |      |      |      | 2175 |      |  |  |
| Thr  | Ile | Val  | Asn  | Lys  | Ala  | Met  | Pro  | Val  | Phe  | Asp  | Lys  | Pro  | Phe  | Tyr  | Thr  |  |  |
|      |     |      | 2180 |      |      |      |      | 2185 |      |      |      |      |      | 2190 |      |  |  |
| Ala  | Ser | Val  | Asn  | Glu  | Asp  | Ile  | Arg  | Met  | Asn  | Thr  | Pro  | Ile  | Leu  | Ser  | Ile  |  |  |
|      |     |      | 2195 |      |      |      |      | 2200 |      |      |      |      | 2205 |      |      |  |  |
| Asn  | Ala | Thr  | Ser  | Pro  | Glu  | Gly  | Gln  | Gly  | Ile  | Ile  | Tyr  | Ile  | Ile  | Ile  | Asp  |  |  |
|      |     | 2210 |      |      |      | 2215 |      |      |      |      | 2220 |      |      |      |      |  |  |
| Gly  | Asp | Pro  | Phe  | Lys  | Gln  | Phe  | Asn  | Ile  | Asp  | Phe  | Asp  | Thr  | Gly  | Val  | Leu  |  |  |
| 2225 |     |      |      |      | 2230 |      |      |      |      | 2235 |      |      |      |      | 2240 |  |  |
| Lys  | Val | Val  | Ser  | Pro  | Leu  | Asp  | Tyr  | Glu  | Val  | Thr  | Ser  | Ala  | Tyr  | Lys  | Leu  |  |  |
|      |     |      |      | 2245 |      |      |      |      | 2250 |      |      |      |      | 2255 |      |  |  |
| Thr  | Ile | Arg  | Ala  | Ser  | Asp  | Ala  | Leu  | Thr  | Gly  | Ala  | Arg  | Ala  | Glu  | Val  | Thr  |  |  |
|      |     |      | 2260 |      |      |      |      | 2265 |      |      |      |      |      | 2270 |      |  |  |
| Val  | Asp | Leu  | Leu  | Val  | Asn  | Asp  | Val  | Asn  | Asp  | Asn  | Pro  | Pro  | Ile  | Phe  | Asp  |  |  |
|      |     | 2275 |      |      |      |      | 2280 |      |      |      |      |      | 2285 |      |      |  |  |
| Gln  | Pro | Thr  | Tyr  | Asn  | Thr  | Thr  | Leu  | Ser  | Glu  | Ala  | Ser  | Leu  | Ile  | Gly  | Thr  |  |  |
|      |     | 2290 |      |      |      | 2295 |      |      |      |      |      | 2300 |      |      |      |  |  |
| Pro  | Val | Leu  | Gln  | Val  | Val  | Ser  | Ile  | Asp  | Ala  | Asp  | Ser  | Glu  | Asn  | Asn  | Lys  |  |  |
| 2305 |     |      |      |      | 2310 |      |      |      |      | 2315 |      |      |      |      | 2320 |  |  |
| Met  | Val | His  | Tyr  | Gln  | Ile  | Val  | Gln  | Asp  | Thr  | Tyr  | Asn  | Ser  | Thr  | Asp  | Tyr  |  |  |
|      |     |      |      | 2325 |      |      |      |      | 2330 |      |      |      |      | 2335 |      |  |  |
| Phe  | His | Ile  | Asp  | Ser  | Ser  | Ser  | Gly  | Leu  | Ile  | Leu  | Thr  | Ala  | Arg  | Met  | Leu  |  |  |
|      |     |      | 2340 |      |      |      | 2345 |      |      |      |      |      | 2350 |      |      |  |  |
| Asp  | His | Glu  | Leu  | Val  | Gln  | His  | Cys  | Thr  | Leu  | Lys  | Val  | Arg  | Ser  | Ile  | Asp  |  |  |
|      |     | 2355 |      |      |      |      | 2360 |      |      |      |      |      | 2365 |      |      |  |  |

|   |      |      |      |
|---|------|------|------|
| Ser Gly Phe Pro Ser Leu Ser Ser Glu Val Leu Val His Ile Tyr Ile | 2370 | 2375 | 2380 |
| Ser Asp Val Asn Asp Asn Pro Pro Val Phe Asn Gln Leu Ile Tyr Glu | 2385 | 2390 | 2395 |
| Ser Tyr Val Ser Glu Leu Ala Pro Arg Gly His Phe Val Thr Cys Val | 2405 | 2410 | 2415 |
| Gln Ala Ser Asp Ala Asp Ser Ser Asp Phe Asp Arg Leu Glu Tyr Ser | 2420 | 2425 | 2430 |
| Ile Leu Ser Gly Asn Asp Arg Thr Ser Phe Leu Met Asp Ser Lys Ser | 2435 | 2440 | 2445 |
| Gly Val Ile Thr Leu Ser Asn His Arg Lys Gln Arg Met Glu Pro Leu | 2450 | 2455 | 2460 |
| Tyr Ser Leu Asn Val Ser Val Ser Asp Gly Leu Phe Thr Ser Thr Ala | 2465 | 2470 | 2475 |
| Gln Val His Ile Arg Val Leu Gly Ala Asn Leu Tyr Ser Pro Ala Phe | 2485 | 2490 | 2495 |
| Ser Gln Ser Thr Tyr Val Ala Glu Val Arg Glu Asn Val Ala Ala Gly | 2500 | 2505 | 2510 |
| Thr Lys Val Ile His Val Arg Ala Thr Asp Gly Asp Pro Gly Thr Tyr | 2515 | 2520 | 2525 |
| Gly Gln Ile Ser Tyr Ala Ile Ile Asn Asp Phe Ala Lys Asp Arg Phe | 2530 | 2535 | 2540 |
| Leu Ile Asp Ser Asn Gly Gln Val Ile Thr Thr Glu Arg Leu Asp Arg | 2545 | 2550 | 2555 |
| Glu Asn Pro Leu Glu Gly Asp Val Ser Ile Phe Val Arg Ala Leu Asp | 2565 | 2570 | 2575 |
| Gly Gly Gly Arg Thr Thr Phe Cys Thr Val Arg Val Ile Val Val Asp | 2580 | 2585 | 2590 |
| Glu Asn Asp Asn Ala Pro Gln Phe Met Thr Val Glu Tyr Arg Ala Ser | 2595 | 2600 | 2605 |
| Val Arg Ala Asp Val Gly Arg Gly His Leu Val Thr Gln Val Gln Ala | 2610 | 2615 | 2620 |
| Ile Asp Pro Asp Asp Gly Ala Asn Ser Arg Ile Thr Tyr Ser Leu Tyr | 2625 | 2630 | 2635 |
| Ser Glu Ala Ser Val Ser Val Ala Asp Leu Leu Glu Ile Asp Pro Asp | 2645 | 2650 | 2655 |
| Asn Gly Trp Met Val Thr Lys Gly Asn Phe Asn Gln Leu Lys Asn Thr | 2660 | 2665 | 2670 |
| Val Leu Ser Phe Phe Val Lys Ala Val Asp Gly Gly Ile Pro Val Lys | 2675 | 2680 | 2685 |
| His Ser Leu Ile Pro Val Tyr Ile His Val Leu Pro Pro Glu Thr Phe | 2690 | 2695 | 2700 |
| Leu Pro Ser Phe Thr Gln Ser Gln Tyr Ser Phe Thr Ile Ala Glu Asp | 2705 | 2710 | 2715 |
| Thr Ala Ile Gly Ser Thr Val Asp Thr Leu Arg Ile Leu Pro Ser Gln | 2725 | 2730 | 2735 |
| Asn Val Trp Phe Ser Thr Val Asn Gly Glu Arg Pro Glu Asn Asn Lys | 2740 | 2745 | 2750 |
| Gly Gly Val Phe Val Ile Glu Gln Glu Thr Gly Thr Ile Lys Leu Asp | 2755 | 2760 | 2765 |
| Lys Arg Leu Asp Arg Glu Thr Ser Pro Ala Phe His Phe Lys Val Ala | 2770 | 2775 | 2780 |
| Ala Thr Ile Pro Leu Asp Lys Val Asp Ile Val Phe Thr Val Asp Val | 2785 | 2790 | 2795 |
| Asp Ile Lys Val Leu Asp Leu Asn Asp Asn Lys Pro Val Phe Glu Thr | 2805 | 2810 | 2815 |

|      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Ser  | Ser  | Tyr  | Asp  | Thr  | Ile  | Ile  | Met  | Glu  | Gly  | Met  | Pro  | Val  | Gly  | Thr  | Lys  |
|      |      |      | 2820 |      |      |      |      | 2825 |      |      |      |      | 2830 |      |      |
| Leu  | Thr  | Gln  | Val  | Arg  | Ala  | Ile  | Asp  | Met  | Asp  | Trp  | Gly  | Ala  | Asn  | Gly  | Gln  |
|      |      | 2835 |      |      |      |      | 2840 |      |      |      |      | 2845 |      |      |      |
| Val  | Thr  | Tyr  | Ser  | Leu  | His  | Ser  | Asp  | Ser  | Gln  | Pro  | Glu  | Lys  | Val  | Met  | Glu  |
|      | 2850 |      |      |      |      | 2855 |      |      |      |      | 2860 |      |      |      |      |
| Ala  | Phe  | Asn  | Ile  | Asp  | Ser  | Asn  | Thr  | Gly  | Trp  | Ile  | Ser  | Thr  | Leu  | Lys  | Asp  |
| 2865 |      |      |      |      | 2870 |      |      |      |      | 2875 |      |      |      |      | 2880 |
| Leu  | Asp  | His  | Glu  | Thr  | Asp  | Pro  | Thr  | Phe  | Thr  | Phe  | Ser  | Val  | Val  | Ala  | Ser  |
|      |      |      |      | 2885 |      |      |      |      | 2890 |      |      |      |      | 2895 |      |
| Asp  | Leu  | Gly  | Glu  | Ala  | Phe  | Ser  | Leu  | Ser  | Ser  | Thr  | Ala  | Leu  | Val  | Ser  | Val  |
|      |      | 2900 |      |      |      |      |      | 2905 |      |      |      |      | 2910 |      |      |
| Arg  | Val  | Thr  | Asp  | Ile  | Asn  | Asp  | Asn  | Ala  | Pro  | Val  | Phe  | Ala  | Gln  | Glu  | Val  |
|      |      | 2915 |      |      |      |      | 2920 |      |      |      |      | 2925 |      |      |      |
| Tyr  | Arg  | Gly  | Asn  | Val  | Lys  | Glu  | Ser  | Asp  | Pro  | Pro  | Gly  | Glu  | Val  | Val  | Ala  |
|      | 2930 |      |      |      |      | 2935 |      |      |      |      | 2940 |      |      |      |      |
| Val  | Leu  | Ser  | Thr  | Trp  | Asp  | Arg  | Asp  | Thr  | Ser  | Asp  | Val  | Asn  | Arg  | Gln  | Val  |
| 2945 |      |      |      |      | 2950 |      |      |      |      | 2955 |      |      |      |      | 2960 |
| Ser  | Tyr  | His  | Ile  | Thr  | Gly  | Gly  | Asn  | Pro  | Arg  | Gly  | Arg  | Phe  | Ala  | Leu  | Gly  |
|      |      |      |      | 2965 |      |      |      |      | 2970 |      |      |      |      | 2975 |      |
| Leu  | Val  | Gln  | Ser  | Glu  | Trp  | Lys  | Val  | Tyr  | Val  | Lys  | Arg  | Pro  | Leu  | Asp  | Arg  |
|      |      |      | 2980 |      |      |      |      | 2985 |      |      |      |      | 2990 |      |      |
| Glu  | Glu  | Gln  | Asp  | Ile  | Tyr  | Phe  | Leu  | Asn  | Ile  | Thr  | Ala  | Thr  | Asp  | Gly  | Leu  |
|      |      | 2995 |      |      |      |      | 3000 |      |      |      |      | 3005 |      |      |      |
| Phe  | Val  | Thr  | Gln  | Ala  | Met  | Val  | Glu  | Val  | Ser  | Val  | Ser  | Asp  | Val  | Asn  | Asp  |
| 3010 |      |      |      |      | 3015 |      |      |      |      |      | 3020 |      |      |      |      |
| Asn  | Ser  | Pro  | Val  | Cys  | Asp  | Gln  | Val  | Ala  | Tyr  | Thr  | Ala  | Leu  | Leu  | Pro  | Glu  |
| 3025 |      |      |      |      | 3030 |      |      |      |      | 3035 |      |      |      |      | 3040 |
| Asp  | Ile  | Pro  | Ser  | Asn  | Lys  | Ile  | Ile  | Leu  | Lys  | Val  | Ser  | Ala  | Lys  | Asp  | Ala  |
|      |      |      |      | 3045 |      |      |      |      | 3050 |      |      |      |      | 3055 |      |
| Asp  | Ile  | Gly  | Ser  | Asn  | Gly  | Tyr  | Ile  | Arg  | Tyr  | Ser  | Leu  | Tyr  | Gly  | Ser  | Gly  |
|      |      | 3060 |      |      |      |      |      | 3065 |      |      |      |      | 3070 |      |      |
| Asn  | Ser  | Glu  | Phe  | Phe  | Leu  | Asp  | Pro  | Glu  | Ser  | Gly  | Glu  | Leu  | Lys  | Thr  | Leu  |
|      |      | 3075 |      |      |      |      | 3080 |      |      |      |      | 3085 |      |      |      |
| Ala  | Leu  | Leu  | Asp  | Arg  | Glu  | Arg  | Ile  | Pro  | Val  | Tyr  | Ser  | Leu  | Met  | Ala  | Lys  |
|      | 3090 |      |      |      |      | 3095 |      |      |      |      | 3100 |      |      |      |      |
| Ala  | Thr  | Asp  | Gly  | Gly  | Gly  | Arg  | Phe  | Cys  | Gln  | Ser  | Asn  | Ile  | His  | Leu  | Ile  |
| 3105 |      |      |      |      | 3110 |      |      |      |      | 3115 |      |      |      |      | 3120 |
| Leu  | Glu  | Asp  | Val  | Asn  | Asp  | Asn  | Pro  | Pro  | Val  | Phe  | Ser  | Ser  | Asp  | His  | Tyr  |
|      |      |      |      | 3125 |      |      |      |      | 3130 |      |      |      |      | 3135 |      |
| Asn  | Thr  | Cys  | Val  | Tyr  | Glu  | Asn  | Thr  | Ala  | Thr  | Lys  | Ala  | Leu  | Leu  | Thr  | Arg  |
|      |      | 3140 |      |      |      |      |      | 3145 |      |      |      |      | 3150 |      |      |
| Val  | Gln  | Ala  | Val  | Asp  | Pro  | Asp  | Ile  | Gly  | Ile  | Asn  | Arg  | Lys  | Val  | Val  | Tyr  |
|      |      | 3155 |      |      |      |      |      |      |      |      |      |      |      |      |      |

|   |      |      |      |      |
|---|------|------|------|------|
| Ile Gly Thr Asn Ala Glu Ile Thr Tyr Leu Ile Arg Ser Gly Asn Glu | 3265 | 3270 | 3275 | 3280 |
| Gln Gly Lys Phe Lys Ile Asn Pro Lys Thr Gly Gly Ile Ser Val Ser |      | 3285 | 3290 | 3295 |
| Glu Val Leu Asp Tyr Glu Leu Cys Lys Arg Phe Tyr Leu Val Val Glu |      | 3300 | 3305 | 3310 |
| Ala Lys Asp Gly Gly Thr Pro Ala Leu Ser Ala Val Ala Thr Val Asn |      | 3315 | 3320 | 3325 |
| Ile Asn Leu Thr Asp Val Asn Asp Asn Pro Pro Lys Phe Ser Gln Asp |      | 3330 | 3335 | 3340 |
| Val Tyr Ser Ala Val Ile Ser Glu Asp Ala Leu Val Gly Asp Ser Val |      | 3345 | 3350 | 3355 |
| Ile Leu Leu Ile Ala Glu Asp Val Asp Ser Gln Pro Asn Gly Gln Ile |      | 3365 | 3370 | 3375 |
| His Phe Ser Ile Val Asn Gly Asp Arg Asp Asn Glu Phe Thr Val Asp |      | 3380 | 3385 | 3390 |
| Pro Val Leu Gly Leu Val Lys Val Lys Lys Lys Leu Asp Arg Glu Arg |      | 3395 | 3400 | 3405 |
| Val Ser Gly Tyr Ser Leu Leu Val Gln Ala Val Asp Ser Gly Ile Pro |      | 3410 | 3415 | 3420 |
| Ala Met Ser Ser Thr Ala Thr Val Asn Ile Asp Ile Ser Asp Val Asn |      | 3425 | 3430 | 3435 |
| Asp Asn Ser Pro Val Phe Thr Pro Ala Asn Tyr Thr Ala Val Ile Gln |      | 3445 | 3450 | 3455 |
| Glu Asn Lys Pro Val Gly Thr Ser Ile Leu Gln Leu Val Val Thr Asp |      | 3460 | 3465 | 3470 |
| Arg Asp Ser Phe His Asn Gly Pro Pro Phe Ser Phe Ser Ile Leu Ser |      | 3475 | 3480 | 3485 |
| Gly Asn Glu Glu Glu Glu Phe Val Leu Asp Pro His Gly Ile Leu Arg |      | 3490 | 3495 | 3500 |
| Ser Ala Val Val Phe Gln His Thr Glu Ser Leu Glu Tyr Val Leu Cys |      | 3505 | 3510 | 3515 |
| Val Gln Ala Lys Asp Ser Gly Lys Pro Gln Gln Val Ser His Thr Tyr |      | 3525 | 3530 | 3535 |
| Ile Arg Val Arg Val Ile Glu Glu Ser Thr His Lys Pro Thr Ala Ile |      | 3540 | 3545 | 3550 |
| Pro Leu Glu Ile Phe Ile Val Thr Met Glu Asp Asp Phe Pro Gly Gly |      | 3555 | 3560 | 3565 |
| Val Ile Gly Lys Ile His Ala Thr Asp Gln Asp Met Tyr Asp Val Leu |      | 3570 | 3575 | 3580 |
| Thr Phe Ala Leu Lys Ser Glu Gln Lys Ser Leu Phe Lys Val Asn Ser |      | 3585 | 3590 | 3595 |
| His Asp Gly Lys Ile Ile Ala Leu Gly Gly Leu Asp Ser Gly Lys Tyr |      | 3605 | 3610 | 3615 |
| Val Leu Asn Val Ser Val Ser Asp Gly Arg Phe Gln Val Pro Ile Asp |      | 3620 | 3625 | 3630 |
| Val Val Val His Val Glu Gln Leu Val His Glu Met Leu Gln Asn Thr |      | 3635 | 3640 | 3645 |
| Val Thr Ile Arg Phe Glu Asn Val Ser Pro Glu Asp Phe Val Gly Leu |      | 3650 | 3655 | 3660 |
| His Met His Gly Phe Arg Arg Thr Leu Arg Asn Ala Val Leu Thr Gln |      | 3665 | 3670 | 3675 |
| Lys Gln Asp Ser Leu Arg Ile Ile Ser Ile Gln Pro Val Ala Gly Thr |      | 3685 | 3690 | 3695 |
| Asn Gln Leu Asp Met Leu Phe Ala Val Glu Met His Ser Ser Glu Phe |      | 3700 | 3705 | 3710 |

|      |      |      |      |      |      |      |      |      |      |      |      |      |     |      |      |  |
|------|------|------|------|------|------|------|------|------|------|------|------|------|-----|------|------|--|
| Tyr  | Lys  | Pro  | Ala  | Tyr  | Leu  | Ile  | Gln  | Lys  | Leu  | Ser  | Asn  | Ala  | Arg | Arg  | His  |  |
|      |      | 3715 |      |      |      |      | 3720 |      |      |      |      | 3725 |     |      |      |  |
| Leu  | Glu  | Asn  | Ile  | Met  | Arg  | Ile  | Ser  | Ala  | Ile  | Leu  | Glu  | Lys  | Asn | Cys  | Ser  |  |
|      |      | 3730 |      |      |      | 3735 |      |      |      |      | 3740 |      |     |      |      |  |
| Gly  | Leu  | Asp  | Cys  | Gln  | Glu  | Gln  | His  | Cys  | Glu  | Gln  | Gly  | Leu  | Ser | Leu  | Asp  |  |
| 3745 |      |      |      | 3750 |      |      |      |      |      | 3755 |      |      |     |      | 3760 |  |
| Ser  | His  | Ala  | Leu  | Met  | Thr  | Tyr  | Ser  | Thr  | Ala  | Arg  | Ile  | Ser  | Phe | Val  | Cys  |  |
|      |      |      | 3765 |      |      |      |      |      | 3770 |      |      |      |     | 3775 |      |  |
| Pro  | Arg  | Phe  | Tyr  | Arg  | Asn  | Val  | Arg  | Cys  | Thr  | Cys  | Asn  | Gly  | Gly | Leu  | Cys  |  |
|      |      | 3780 |      |      |      |      |      | 3785 |      |      |      | 3790 |     |      |      |  |
| Pro  | Gly  | Ser  | Asn  | Asp  | Pro  | Cys  | Val  | Glu  | Lys  | Pro  | Cys  | Pro  | Gly | Asp  | Met  |  |
|      |      | 3795 |      |      |      | 3800 |      |      |      |      | 3805 |      |     |      |      |  |
| Gln  | Cys  | Val  | Gly  | Tyr  | Glu  | Ala  | Ser  | Arg  | Arg  | Pro  | Phe  | Leu  | Cys | Gln  | Cys  |  |
|      | 3810 |      |      |      |      | 3815 |      |      |      |      | 3820 |      |     |      |      |  |
| Pro  | Pro  | Gly  | Lys  | Leu  | Gly  | Glu  | Cys  | Ser  | Gly  | His  | Thr  | Ser  | Leu | Ser  | Phe  |  |
| 3825 |      |      |      | 3830 |      |      |      |      |      | 3835 |      |      |     |      | 3840 |  |
| Ala  | Gly  | Asn  | Ser  | Tyr  | Ile  | Lys  | Tyr  | Arg  | Leu  | Ser  | Glu  | Asn  | Ser | Lys  | Glu  |  |
|      |      |      | 3845 |      |      |      |      | 3850 |      |      |      |      |     | 3855 |      |  |
| Glu  | Asp  | Phe  | Lys  | Leu  | Ala  | Leu  | Arg  | Leu  | Arg  | Thr  | Leu  | Gln  | Ser | Asn  | Gly  |  |
|      |      | 3860 |      |      |      |      |      | 3865 |      |      |      | 3870 |     |      |      |  |
| Ile  | Ile  | Met  | Tyr  | Thr  | Arg  | Ala  | Asn  | Pro  | Cys  | Ile  | Ile  | Leu  | Lys | Ile  | Val  |  |
|      | 3875 |      |      |      |      | 3880 |      |      |      |      |      | 3885 |     |      |      |  |
| Asp  | Gly  | Lys  | Leu  | Trp  | Phe  | Gln  | Leu  | Asp  | Cys  | Gly  | Ser  | Gly  | Pro | Gly  | Ile  |  |
| 3890 |      |      |      | 3895 |      |      |      |      |      | 3900 |      |      |     |      |      |  |
| Leu  | Gly  | Ile  | Ser  | Gly  | Arg  | Ala  | Val  | Asn  | Asp  | Gly  | Ser  | Trp  | His | Ser  | Val  |  |
| 3905 |      |      |      | 3910 |      |      |      |      |      | 3915 |      |      |     |      | 3920 |  |
| Phe  | Leu  | Glu  | Leu  | Asn  | Arg  | Asn  | Phe  | Thr  | Ser  | Leu  | Ser  | Leu  | Asp | Asp  | Ser  |  |
|      |      |      | 3925 |      |      |      |      | 3930 |      |      |      |      |     | 3935 |      |  |
| Tyr  | Val  | Glu  | Arg  | Arg  | Arg  | Ala  | Pro  | Leu  | Tyr  | Phe  | Gln  | Thr  | Leu | Ser  | Thr  |  |
|      |      | 3940 |      |      |      |      |      | 3945 |      |      |      | 3950 |     |      |      |  |
| Glu  | Ser  | Ser  | Ile  | Tyr  | Phe  | Gly  | Ala  | Leu  | Val  | Gln  | Ala  | Asp  | Asn | Ile  | Arg  |  |
|      | 3955 |      |      |      |      | 3960 |      |      |      | 3965 |      |      |     |      |      |  |
| Ser  | Leu  | Thr  | Asp  | Thr  | Arg  | Val  | Thr  | Gln  | Val  | Leu  | Ser  | Gly  | Phe | Gln  | Gly  |  |
|      | 3970 |      |      |      | 3975 |      |      |      |      | 3980 |      |      |     |      |      |  |
| Cys  | Leu  | Asp  | Ser  | Val  | Ile  | Leu  | Asn  | Asn  | Asn  | Glu  | Leu  | Pro  | Leu | Gln  | Asn  |  |
| 3985 |      |      |      | 3990 |      |      |      |      |      | 3995 |      |      |     |      | 4000 |  |
| Lys  | Arg  | Ser  | Ser  | Phe  | Ala  | Glu  | Val  | Val  | Gly  | Leu  | Thr  | Glu  | Leu | Lys  | Leu  |  |
|      |      |      | 4005 |      |      |      |      | 4010 |      |      |      |      |     | 4015 |      |  |
| Gly  | Cys  | Val  | Leu  | Tyr  | Pro  | Asp  | Ala  | Cys  | Lys  | Arg  | Ser  | Pro  | Cys | Gln  | His  |  |
|      |      | 4020 |      |      |      |      |      | 4025 |      |      |      | 4030 |     |      |      |  |
| Gly  | Gly  | Ser  | Cys  | Thr  | Gly  | Leu  | Pro  | Ser  | Gly  | Gly  | Tyr  | Gln  | Cys | Thr  | Cys  |  |
|      | 4035 |      |      |      |      | 4040 |      |      |      |      | 4045 |      |     |      |      |  |
| Leu  | Ser  | Gln  | Phe  | Thr  | Gly  | Arg  | Asn  | Cys  | Glu  | Ser  | Glu  | Ile  | Thr | Ala  | Cys  |  |
|      | 4050 |      |      |      | 4055 |      |      |      |      | 4060 |      |      |     |      |      |  |
| Phe  | Pro  | Asn  | Pro  | Cys  | Arg  | Asn  | Gly  | Gly  | Ser  | Cys  | Asp  | Pro  | Ile | Gly  | Asn  |  |
| 4065 |      |      |      | 4070 |      |      |      |      |      | 4075 |      |      |     |      | 4080 |  |
| Thr  | Phe  | Ile  | Cys  | Asn  | Cys  | Lys  | Ala  | Gly  | Leu  | Thr  | Gly  | Val  | Thr | Cys  | Glu  |  |
|      |      |      | 4085 |      |      |      |      | 4090 |      |      |      |      |     | 4095 |      |  |
| Glu  | Asp  | Ile  | Asn  | Glu  | Cys  | Glu  | Arg  | Glu  | Glu  | Cys  | Glu  | Asn  | Gly | Gly  | Ser  |  |
|      |      | 4100 |      |      |      | 4105 |      |      |      |      | 4110 |      |     |      |      |  |
| Cys  | Val  | Asn  | Val  | Phe  | Gly  | Ser  | Phe  | Leu  | Cys  | Asn  | Cys  | Thr  | Pro | Gly  | Tyr  |  |
|      | 4115 |      |      |      |      | 4120 |      |      |      |      | 4125 |      |     |      |      |  |
| Val  | Gly  | Gln  | Tyr  | Cys  | Gly  | Leu  | Arg  | Pro  | Val  | Val  | Val  | Pro  | Asn | Ile  | Gln  |  |
|      | 4130 |      |      |      |      | 4135 |      |      |      |      | 4140 |      |     |      |      |  |
| Ala  | Gly  | His  | Ser  | Tyr  | Val  | Gly  | Lys  | Glu  | Glu  | Leu  | Ile  | Gly  | Ile | Ala  | Val  |  |
| 4145 |      |      |      |      | 4150 |      |      |      |      | 4155 |      |      |     |      | 4160 |  |

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|------|------|------|------|------|-----|------|------|------|------|------|------|------|------|------|------|
| Val  | Leu  | Phe  | Val  | Ile  | Phe | Ile  | Leu  | Val  | Val  | Leu  | Phe  | Ile  | Val  | Phe  | Arg  |
|      |      |      |      | 4165 |     |      |      |      | 4170 |      |      |      |      | 4175 |      |
| Lys  | Lys  | Val  | Phe  | Arg  | Lys | Asn  | Tyr  | Ser  | Arg  | Asn  | Asn  | Ile  | Thr  | Leu  | Val  |
|      |      |      | 4180 |      |     |      |      | 4185 |      |      |      |      |      | 4190 |      |
| Gln  | Asp  | Pro  | Ala  | Thr  | Ala | Ala  | Leu  | Leu  | Asn  | Lys  | Ser  | Asn  | Gly  | Ile  | Pro  |
|      |      | 4195 |      |      |     |      | 4200 |      |      |      |      | 4205 |      |      |      |
| Phe  | Arg  | Asn  | Leu  | Arg  | Gly | Ser  | Gly  | Asp  | Gly  | Arg  | Asn  | Val  | Tyr  | Gln  | Glu  |
|      | 4210 |      |      |      |     | 4215 |      |      |      |      | 4220 |      |      |      |      |
| Val  | Gly  | Pro  | Pro  | Gln  | Val | Pro  | Val  | Arg  | Pro  | Met  | Ala  | Tyr  | Thr  | Pro  | Cys  |
| 4225 |      |      |      | 4230 |     |      |      |      |      | 4235 |      |      |      |      | 4240 |
| Phe  | Gln  | Ser  | Asp  | Ser  | Arg | Ser  | Asn  | Leu  | Asp  | Lys  | Ile  | Val  | Asp  | Gly  | Leu  |
|      |      |      | 4245 |      |     |      |      |      | 4250 |      |      |      |      | 4255 |      |
| Gly  | Gly  | Glu  | His  | Gln  | Glu | Met  | Thr  | Thr  | Phe  | His  | Pro  | Glu  | Ser  | Pro  | Arg  |
|      |      |      | 4260 |      |     |      |      | 4265 |      |      |      | 4270 |      |      |      |
| Ile  | Leu  | Thr  | Ala  | Arg  | Arg | Gly  | Val  | Val  | Val  | Cys  | Ser  | Val  | Ala  | Pro  | Asn  |
|      | 4275 |      |      |      |     |      | 4280 |      |      |      |      | 4285 |      |      |      |
| Leu  | Pro  | Ala  | Val  | Ser  | Pro | Cys  | Arg  | Ser  | Asp  | Cys  | Asp  | Ser  | Ile  | Arg  | Lys  |
|      | 4290 |      |      |      |     | 4295 |      |      |      | 4300 |      |      |      |      |      |
| Asn  | Gly  | Trp  | Asp  | Ala  | Gly | Thr  | Glu  | Asn  | Lys  | Gly  | Val  | Asp  | Asp  | Pro  | Gly  |
| 4305 |      |      |      | 4310 |     |      |      |      |      | 4315 |      |      |      | 4320 |      |
| Glu  | Val  | Thr  | Cys  | Phe  | Ala | Gly  | Ser  | Asn  | Lys  | Gly  | Ser  | Asn  | Ser  | Glu  | Val  |
|      |      |      | 4325 |      |     |      |      |      | 4330 |      |      |      |      | 4335 |      |
| Gln  | Ser  | Leu  | Ser  | Ser  | Phe | Gln  | Ser  | Asp  | Ser  | Gly  | Asp  | Asp  | Asn  | Ala  | Ser  |
|      |      | 4340 |      |      |     |      |      | 4345 |      |      |      |      | 4350 |      |      |
| Ile  | Val  | Thr  | Val  | Ile  | Gln | Leu  | Val  | Asn  | Asn  | Val  | Val  | Asp  | Thr  | Ile  | Glu  |
|      | 4355 |      |      |      |     |      | 4360 |      |      |      |      | 4365 |      |      |      |
| Asn  | Glu  | Val  | Ser  | Val  | Met | Asp  | Gln  | Gly  | Gln  | Asn  | Tyr  | Asn  | Arg  | Ala  | Tyr  |
|      | 4370 |      |      |      |     | 4375 |      |      |      | 4380 |      |      |      |      |      |
| His  | Trp  | Asp  | Thr  | Ser  | Asp | Trp  | Met  | Pro  | Gly  | Ala  | Arg  | Leu  | Ser  | Asp  | Ile  |
| 4385 |      |      |      | 4390 |     |      |      |      |      | 4395 |      |      |      | 4400 |      |
| Glu  | Glu  | Val  | Pro  | Asn  | Tyr | Glu  | Asn  | Gln  | Asp  | Gly  | Gly  | Ser  | Ala  | His  | Gln  |
|      |      |      | 4405 |      |     |      |      |      | 4410 |      |      |      |      | 4415 |      |
| Gly  | Ser  | Thr  | Arg  | Glu  | Leu | Glu  | Ser  | Asp  | Tyr  | Tyr  | Leu  | Gly  | Gly  | Tyr  | Asp  |
|      |      |      | 4420 |      |     |      |      | 4425 |      |      |      | 4430 |      |      |      |
| Ile  | Asp  | Ser  | Glu  | Tyr  | Pro | Pro  | Pro  | His  | Glu  | Glu  | Glu  | Phe  | Leu  | Ser  | Gln  |
|      | 4435 |      |      |      |     |      | 4440 |      |      |      |      | 4445 |      |      |      |
| Asp  | Gln  | Leu  | Pro  | Pro  | Pro | Leu  | Pro  | Glu  | Asp  | Phe  | Pro  | Asp  | Gln  | Tyr  | Glu  |
|      | 4450 |      |      |      |     | 4455 |      |      |      | 4460 |      |      |      |      |      |
| Ala  | Leu  | Pro  | Pro  | Ser  | Gln | Pro  | Val  | Ser  | Leu  | Ala  | Ser  | Thr  | Leu  | Ser  | Pro  |
| 4465 |      |      |      | 4470 |     |      |      |      |      | 4475 |      |      |      | 4480 |      |
| Asp  | Cys  | Arg  | Arg  | Arg  | Pro | Gln  | Phe  | His  | Pro  | Ser  | Gln  | Tyr  | Leu  | Pro  | Pro  |
|      |      |      | 4485 |      |     |      |      |      | 4490 |      |      |      |      | 4495 |      |
| His  | Pro  | Phe  | Pro  | Asn  | Glu | Thr  | Asp  | Leu  | Val  | Gly  | Pro  | Pro  | Ala  | Ser  | Cys  |
|      |      | 4500 |      |      |     |      |      | 4505 |      |      |      |      | 4510 |      |      |
| Glu  | Phe  | Ser  | Thr  | Phe  | Ala | Val  | Ser  | Met  | Asn  | Gln  | Gly  | Thr  | Glu  | Pro  | Thr  |
|      | 4515 |      |      |      |     |      | 4520 |      |      |      |      | 4525 |      |      |      |
| Gly  | Pro  | Ala  | Asp  | Ser  | Val | Ser  | Leu  | Ser  | Leu  | His  | Asn  | Ser  | Arg  | Gly  | Thr  |
|      | 4530 |      |      |      |     | 4535 |      |      |      | 4540 |      |      |      |      |      |
| Ser  | Ser  | Ser  | Asp  | Val  | Ser | Ala  | Asn  | Cys  | Gly  | Phe  | Asp  | Asp  | Ser  | Glu  | Val  |
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| Ala  | Met  | Ser  | Asp  | Tyr  | Glu | Ser  | Val  | Gly  | Glu  | Leu  | Ser  | Leu  | Ala  | Ser  | Leu  |
|      |      |      | 4565 |      |     |      |      | 4570 |      |      |      |      | 4575 |      |      |
| His  | Ile  | Pro  | Phe  | Val  | Glu | Thr  | Gln  | His  | Gln  | Thr  | Gln  | Val  |      |      |      |
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<400> 3

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|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | Asp | Ile | Ile | Met | Gly | His | Cys | Val | Gly | Thr | Arg | Pro | Pro | Ala | Cys |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |     |
| Cys | Leu | Ile | Leu | Leu | Leu | Phe | Lys | Leu | Leu | Ala | Thr | Val | Ser | Gln | Gly |
|     |     |     | 20  |     |     |     |     | 25  |     |     |     |     | 30  |     |     |
| Leu | Pro | Gly | Thr | Gly | Pro | Leu | Gly | Phe | His | Phe | Thr | His | Ser | Ile | Tyr |
|     |     | 35  |     |     |     |     | 40  |     |     |     |     | 45  |     |     |     |
| Asn | Ala | Thr | Val | Tyr | Glu | Asn | Ser | Ala | Ala | Arg | Thr | Tyr | Val | Asn | Ser |
|     | 50  |     |     |     |     |     | 55  |     |     |     | 60  |     |     |     |     |
| Gln | Ser | Arg | Met | Gly | Ile | Thr | Leu | Ile | Asp | Leu | Ser | Trp | Asp | Ile | Lys |
| 65  |     |     |     |     | 70  |     |     |     | 75  |     |     |     |     | 80  |     |
| Tyr | Arg | Ile | Val | Ser | Gly | Asp | Glu | Glu | Gly | Phe | Phe | Lys | Ala | Glu | Glu |
|     |     |     | 85  |     |     |     |     |     | 90  |     |     |     | 95  |     |     |
| Val | Ile | Ile | Ala | Asp | Phe | Cys | Phe | Leu | Arg | Ile | Arg | Thr | Lys | Gly | Gly |
|     |     |     | 100 |     |     |     |     |     | 105 |     |     |     | 110 |     |     |
| Asn | Ser | Ala | Ile | Leu | Asn | Arg | Glu | Ile | Gln | Asp | Asn | Tyr | Leu | Leu | Ile |
|     |     | 115 |     |     |     |     | 120 |     |     |     |     | 125 |     |     |     |
| Val | Lys | Gly | Ser | Val | Arg | Gly | Glu | Asp | Leu | Glu | Ala | Trp | Thr | Lys | Val |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|     | 130 |     |     |     |     | 135 |     |     |     |     | 140 |     |     |     |     |
| Asn | Ile | Gln | Val | Leu | Asp | Met | Asn | Asp | Leu | Arg | Pro | Leu | Phe | Ser | Pro |
| 145 |     |     |     |     | 150 |     |     |     |     | 155 |     |     |     |     | 160 |
| Thr | Thr | Tyr | Ser | Val | Thr | Ile | Ala | Glu | Ser | Thr | Pro | Leu | Arg | Thr | Ser |
|     |     |     |     | 165 |     |     |     |     | 170 |     |     |     |     | 175 |     |
| Val | Ala | Gln | Val | Thr | Ala | Thr | Asp | Ala | Asp | Ile | Gly | Ser | Asn | Gly | Glu |
|     |     |     |     | 180 |     |     |     | 185 |     |     |     |     | 190 |     |     |
| Phe | Tyr | Tyr | Tyr | Phe | Lys | Asn | Lys | Val | Asp | Leu | Phe | Ser | Val | His | Pro |
|     |     |     |     | 195 |     |     | 200 |     |     |     |     | 205 |     |     |     |
| Thr | Ser | Gly | Val | Ile | Ser | Leu | Ser | Gly | Arg | Leu | Asn | Tyr | Asp | Glu | Lys |
|     |     |     |     | 210 |     | 215 |     |     |     |     | 220 |     |     |     |     |
| Asn | Arg | Tyr | Asp | Leu | Glu | Ile | Leu | Ala | Val | Asp | Arg | Gly | Met | Lys | Leu |
| 225 |     |     |     |     | 230 |     |     |     |     | 235 |     |     |     |     | 240 |
| Tyr | Gly | Asn | Asn | Gly | Val | Ser | Ser | Thr | Ala | Lys | Leu | Tyr | Val | His | Ile |
|     |     |     |     | 245 |     |     |     |     | 250 |     |     |     |     | 255 |     |
| Glu | Arg | Ile | Asn | Glu | His | Ala | Pro | Thr | Ile | His | Val | Val | Thr | His | Val |
|     |     |     |     | 260 |     |     |     | 265 |     |     |     |     |     | 270 |     |
| Pro | Phe | Ser | Leu | Glu | Lys | Glu | Pro | Thr | Tyr | Ala | Val | Val | Thr | Val | Asp |
|     |     |     |     | 275 |     |     | 280 |     |     |     |     |     | 285 |     |     |
| Asp | Leu | Asp | Asp | Gly | Ala | Asn | Gly | Glu | Ile | Glu | Ser | Val | Ser | Ile | Val |
|     |     |     |     | 290 |     | 295 |     |     |     |     | 300 |     |     |     |     |
| Ala | Gly | Asp | Pro | Leu | Asp | Gln | Phe | Phe | Leu | Ala | Lys | Glu | Gly | Lys | Trp |
| 305 |     |     |     |     | 310 |     |     |     |     | 315 |     |     |     |     | 320 |
| Leu | Asn | Glu | Tyr | Lys | Ile | Lys | Glu | Arg | Lys | Gln | Ile | Asp | Trp | Glu | Ser |
|     |     |     |     | 325 |     |     |     |     | 330 |     |     |     |     | 335 |     |
| Phe | Pro | Tyr | Gly | Tyr | Asn | Leu | Thr | Leu | Gln | Ala | Lys | Asp | Lys | Gly | Ser |
|     |     |     |     | 340 |     |     |     | 345 |     |     |     |     | 350 |     |     |
| Pro | Gln | Lys | Cys | Ser | Ala | Leu | Lys | Ala | Val | Tyr | Ile | Gly | Asn | Pro | Thr |
|     |     |     |     | 355 |     |     | 360 |     |     |     |     | 365 |     |     |     |
| Arg | Asp | Thr | Val | Pro | Ile | Arg | Phe | Glu | Lys | Glu | Val | Tyr | Asp | Val | Ser |
|     |     |     |     | 370 |     | 375 |     |     |     |     | 380 |     |     |     |     |
| Ile | Ser | Glu | Phe | Ser | Pro | Pro | Gly | Val | Val | Val | Ala | Ile | Val | Lys | Leu |
| 385 |     |     |     |     | 390 |     |     |     |     | 395 |     |     |     |     | 400 |
| Ser | Pro | Glu | Pro | Ile | Asp | Val | Glu | Tyr | Lys | Leu | Ser | Pro | Gly | Glu | Asp |
|     |     |     |     | 405 |     |     |     |     | 410 |     |     |     |     | 415 |     |
| Ala | Val | Tyr | Phe | Lys | Ile | Asn | Pro | Arg | Ser | Gly | Leu | Ile | Val | Thr | Ala |
|     |     |     |     | 420 |     |     |     | 425 |     |     |     |     | 430 |     |     |
| Arg | Pro | Leu | Asn | Thr | Val | Lys | Lys | Glu | Val | Tyr | Lys | Leu | Glu | Val | Thr |
|     |     |     |     | 435 |     |     | 440 |     |     |     |     | 445 |     |     |     |
| Asn | Lys | Glu | Gly | Asp | Leu | Lys | Ala | Gln | Val | Thr | Ile | Ser | Ile | Glu | Asp |
|     |     |     |     | 450 |     | 455 |     |     |     |     | 460 |     |     |     |     |
| Ala | Asn | Asp | His | Thr | Pro | Glu | Phe | Gln | Gln | Pro | Leu | Tyr | Asp | Ala | Tyr |
| 465 |     |     |     |     | 470 |     |     |     |     | 475 |     |     |     |     | 480 |
| Val | Asn | Glu | Ser | Val | Pro | Val | Gly | Thr | Ser | Val | Leu | Thr | Val | Ser | Ala |
|     |     |     |     | 485 |     |     |     |     | 490 |     |     |     |     |     |     |

|      |     |     |     |     |     |     |  |      |     |     |     |     |     |     |     |      |  |     |     |     |     |     |     |     |     |     |  |
|------|-----|-----|-----|-----|-----|-----|--|------|-----|-----|-----|-----|-----|-----|-----|------|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| 580  |     |     |     |     |     |     |  | 585  |     |     |     |     |     |     |     | 590  |  |     |     |     |     |     |     |     |     |     |  |
| Val  | Gly | Gly | His | Ile | Thr | Ala |  | Val  | Ser | Ala | Ile | Asp | Ile | Asp | Glu | Leu  |  | Val | Ser | Ala | Ile | Asp | Ile | Asp | Glu | Leu |  |
| 595  |     |     |     |     |     |     |  | 600  |     |     |     |     |     |     |     | 605  |  |     |     |     |     |     |     |     |     |     |  |
| Glu  | Leu | Val | Lys | Tyr | Lys | Ile |  | Ile  | Ser | Gly | Asn | Glu | Leu | Gly | Phe | Phe  |  | Ile | Ser | Gly | Asn | Glu | Leu | Gly | Phe | Phe |  |
| 610  |     |     |     |     |     |     |  | 615  |     |     |     |     |     |     |     | 620  |  |     |     |     |     |     |     |     |     |     |  |
| Tyr  | Leu | Asn | Pro | Asp | Ser | Gly |  | Val  | Leu | Gln | Leu | Lys | Lys | Ser | Leu | Thr  |  | Val | Leu | Gln | Leu | Lys | Lys | Ser | Leu | Thr |  |
| 625  |     |     |     |     |     |     |  | 630  |     |     |     |     |     |     |     | 635  |  |     |     |     |     |     |     |     |     |     |  |
| Asn  | Ser | Gly | Ile | Lys | Asn | Gly |  | Asn  | Phe | Ala | Leu | Arg | Ile | Thr | Ala | Thr  |  | Asn | Phe | Ala | Leu | Arg | Ile | Thr | Ala | Thr |  |
| 645  |     |     |     |     |     |     |  | 650  |     |     |     |     |     |     |     | 655  |  |     |     |     |     |     |     |     |     |     |  |
| Asp  | Gly | Glu | Asn | Leu | Ala | Asp |  | Pro  | Met | Ser | Ile | Asn | Ile | Ser | Val | Leu  |  | Pro | Met | Ser | Ile | Asn | Ile | Ser | Val | Leu |  |
| 660  |     |     |     |     |     |     |  | 665  |     |     |     |     |     |     |     | 670  |  |     |     |     |     |     |     |     |     |     |  |
| His  | Gly | Lys | Val | Ser | Ser | Lys |  | Ser  | Phe | Ser | Cys | Arg | Glu | Thr | Arg | Val  |  | Ser | Phe | Ser | Cys | Arg | Glu | Thr | Arg | Val |  |
| 675  |     |     |     |     |     |     |  | 680  |     |     |     |     |     |     |     | 685  |  |     |     |     |     |     |     |     |     |     |  |
| Ala  | Gln | Lys | Leu | Ala | Glu | Lys |  | Leu  | Leu | Ile | Lys | Ala | Lys | Ala | Asn | Gly  |  | Leu | Leu | Ile | Lys | Ala | Lys | Ala | Asn | Gly |  |
| 690  |     |     |     |     |     |     |  | 695  |     |     |     |     |     |     |     | 700  |  |     |     |     |     |     |     |     |     |     |  |
| Lys  | Leu | Asn | Leu | Glu | Asp | Gly |  | Phe  | Leu | Asp | Phe | Tyr | Ser | Ile | Asn | Arg  |  | Phe | Leu | Asp | Phe | Tyr | Ser | Ile | Asn | Arg |  |
| 705  |     |     |     |     |     |     |  | 710  |     |     |     |     |     |     |     | 715  |  |     |     |     |     |     |     |     |     |     |  |
| Gln  | Gly | Pro | Tyr | Phe | Asp | Lys |  | Ser  | Phe | Pro | Ser | Asp | Val | Ala | Val | Lys  |  | Ser | Phe | Pro | Ser | Asp | Val | Ala | Val | Lys |  |
| 725  |     |     |     |     |     |     |  | 730  |     |     |     |     |     |     |     | 735  |  |     |     |     |     |     |     |     |     |     |  |
| Glu  | Asp | Leu | Pro | Val | Gly | Ala |  | Asn  | Ile | Leu | Lys | Ile | Lys | Ala | Tyr | Asp  |  | Asn | Ile | Leu | Lys | Ile | Lys | Ala | Tyr | Asp |  |
| 740  |     |     |     |     |     |     |  | 745  |     |     |     |     |     |     |     | 750  |  |     |     |     |     |     |     |     |     |     |  |
| Ala  | Asp | Ser | Gly | Phe | Asn | Gly |  | Lys  | Val | Leu | Phe | Thr | Ile | Ser | Asp | Gly  |  | Lys | Val | Leu | Phe | Thr | Ile | Ser | Asp | Gly |  |
| 755  |     |     |     |     |     |     |  | 760  |     |     |     |     |     |     |     | 765  |  |     |     |     |     |     |     |     |     |     |  |
| Asn  | Thr | Asp | Ser | Cys | Phe | Asn |  | Ile  | Asp | Met | Glu | Thr | Gly | Gln | Leu | Lys  |  | Ile | Asp | Met | Glu | Thr | Gly | Gln | Leu | Lys |  |
| 770  |     |     |     |     |     |     |  | 775  |     |     |     |     |     |     |     | 780  |  |     |     |     |     |     |     |     |     |     |  |
| Val  | Leu | Met | Pro | Met | Asp | Arg |  | Glu  | His | Thr | Asp | Leu | Tyr | Leu | Leu | Asn  |  | Glu | His | Thr | Asp | Leu | Tyr | Leu | Leu | Asn |  |
| 785  |     |     |     |     |     |     |  | 790  |     |     |     |     |     |     |     | 795  |  |     |     |     |     |     |     |     |     |     |  |
| Ile  | Thr | Ile | Tyr | Asp | Leu | Gly |  | Asn  | Pro | Gln | Lys | Ser | Ser | Trp | Arg | Leu  |  | Asn | Pro | Gln | Lys | Ser | Ser | Trp | Arg | Leu |  |
| 805  |     |     |     |     |     |     |  | 810  |     |     |     |     |     |     |     | 815  |  |     |     |     |     |     |     |     |     |     |  |
| Leu  | Thr | Ile | Asn | Val | Glu | Asp |  | Ala  | Asn | Asp | Asn | Ser | Pro | Val | Phe | Ile  |  | Ala | Asn | Asp | Asn | Ser | Pro | Val | Phe | Ile |  |
| 820  |     |     |     |     |     |     |  | 825  |     |     |     |     |     |     |     | 830  |  |     |     |     |     |     |     |     |     |     |  |
| Gln  | Asp | Ser | Tyr | Ser | Val | Asn |  | Ile  | Leu | Glu | Ser | Ser | Gly | Ile | Gly | Thr  |  | Ile | Leu | Glu | Ser | Ser | Gly | Ile | Gly | Thr |  |
| 835  |     |     |     |     |     |     |  | 840  |     |     |     |     |     |     |     | 845  |  |     |     |     |     |     |     |     |     |     |  |
| Glu  | Ile | Ile | Gln | Val | Glu | Ala |  | Arg  | Asp | Lys | Asp | Leu | Gly | Ser | Asn | Gly  |  | Arg | Asp | Lys | Asp | Leu | Gly | Ser | Asn | Gly |  |
| 850  |     |     |     |     |     |     |  | 855  |     |     |     |     |     |     |     | 860  |  |     |     |     |     |     |     |     |     |     |  |
| Glu  | Val | Thr | Tyr | Ser | Val | Leu |  | Thr  | Asp | Thr | Gln | Gln | Phe | Ala | Ile | Asn  |  | Thr | Asp | Thr | Gln | Gln | Phe | Ala | Ile | Asn |  |
| 865  |     |     |     |     |     |     |  | 870  |     |     |     |     |     |     |     | 875  |  |     |     |     |     |     |     |     |     |     |  |
| Ser  | Ser | Thr | Gly | Ile | Val | Tyr |  | Val  | Ala | Asp | Gln | Leu | Asp | Arg | Glu | Ser  |  | Val | Ala | Asp | Gln | Leu | Asp | Arg | Glu | Ser |  |
| 885  |     |     |     |     |     |     |  | 890  |     |     |     |     |     |     |     | 895  |  |     |     |     |     |     |     |     |     |     |  |
| Lys  | Ala | Asn | Tyr | Ser | Leu | Lys |  | Ile  | Glu | Ala | Arg | Asp | Lys | Ala | Glu | Ser  |  | Ile | Glu | Ala | Arg | Asp | Lys | Ala | Glu | Ser |  |
| 900  |     |     |     |     |     |     |  | 905  |     |     |     |     |     |     |     | 910  |  |     |     |     |     |     |     |     |     |     |  |
| Gly  | Gln | Gln | Leu | Phe | Ser | Val |  | Val  | Thr | Leu | Lys | Val | Phe | Leu | Asp | Asp  |  | Val | Thr | Leu | Lys | Val | Phe | Leu | Asp | Asp |  |
| 915  |     |     |     |     |     |     |  | 920  |     |     |     |     |     |     |     | 925  |  |     |     |     |     |     |     |     |     |     |  |
| Val  | Asn | Asp | Cys | Ser | Pro | Ala |  | Phe  | Ile | Pro | Ser | Ser | Tyr | Ser | Val | Lys  |  | Phe | Ile | Pro | Ser | Ser | Tyr | Ser | Val | Lys |  |
| 930  |     |     |     |     |     |     |  | 935  |     |     |     |     |     |     |     | 940  |  |     |     |     |     |     |     |     |     |     |  |
| Val  | Leu | Glu | Asp | Leu | Pro | Val |  | Gly  | Thr | Val | Ile | Ala | Trp | Leu | Glu | Thr  |  | Gly | Thr | Val | Ile | Ala | Trp | Leu | Glu | Thr |  |
| 945  |     |     |     |     |     |     |  | 950  |     |     |     |     |     |     |     | 955  |  |     |     |     |     |     |     |     |     |     |  |
| His  | Asp | Pro | Asp | Leu | Gly | Leu |  | Gly  | Gly | Gln | Val | Arg | Tyr | Ser | Leu | Val  |  | Gly | Gly | Gln | Val | Arg | Tyr | Ser | Leu | Val |  |
| 965  |     |     |     |     |     |     |  | 970  |     |     |     |     |     |     |     | 975  |  |     |     |     |     |     |     |     |     |     |  |
| Asn  | Asp | Tyr | Asn | Gly | Arg | Phe |  | Glu  | Ile | Asp | Lys | Ala | Ser | Gly | Ala | Ile  |  | Glu | Ile | Asp | Lys | Ala | Ser | Gly | Ala | Ile |  |
| 980  |     |     |     |     |     |     |  | 985  |     |     |     |     |     |     |     | 990  |  |     |     |     |     |     |     |     |     |     |  |
| Arg  | Leu | Ser | Lys | Glu | Leu | Asp |  | Tyr  | Glu | Lys | Gln | Gln | Phe | Tyr | Asn | Leu  |  | Tyr | Glu | Lys | Gln | Gln | Phe | Tyr | Asn | Leu |  |
| 995  |     |     |     |     |     |     |  | 1000 |     |     |     |     |     |     |     | 1005 |  |     |     |     |     |     |     |     |     |     |  |
| Thr  | Val | Arg | Ala | Lys | Asp | Lys |  | Gly  | Arg | Pro | Val | Ser | Leu | Ser | Ser | Val  |  | Gly | Arg | Pro | Val | Ser | Leu | Ser | Ser | Val |  |
| 1010 |     |     |     |     |     |     |  | 1015 |     |     |     |     |     |     |     | 1020 |  |     |     |     |     |     |     |     |     |     |  |
| Ser  | Phe | Val | Glu | Val | Glu | Val |  | Val  | Asp | Val | Asn | Glu | Asn | Leu | His | Thr  |  | Val | Asp | Val | Asn | Glu | Asn | Leu | His | Thr |  |

|   |      |      |      |      |      |      |
|---|------|------|------|------|------|------|
| 1025  |      | 1030 |      | 1035 |      | 1040 |
| Pro Tyr Phe Pro Asp Phe Ala Val Val Gly Ser Val Lys Glu Asn Ser |      |      |      |      |      |      |
|   | 1045 |      | 1050 |      | 1055 |      |
| Arg Ile Gly Thr Ser Val Leu Gln Val Thr Ala Arg Asp Glu Asp Ser |      |      |      |      |      |      |
|   | 1060 |      | 1065 |      | 1070 |      |
| Gly Arg Asp Gly Glu Ile Gln Tyr Ser Ile Arg Asp Gly Ser Gly Leu |      |      |      |      |      |      |
|   | 1075 |      | 1080 |      | 1085 |      |
| Gly Arg Phe Ser Ile Asp Asp Glu Ser Gly Val Ile Thr Ala Ala Asp |      |      |      |      |      |      |
|   | 1090 |      | 1095 |      | 1100 |      |
| Ile Leu Asp Arg Glu Thr Met Gly Ser Tyr Trp Leu Thr Val Tyr Ala |      |      |      |      |      |      |
| 1105  | 1110 |      | 1115 |      | 1120 |      |
| Thr Asp Arg Gly Val Val Pro Leu Tyr Ser Thr Ile Glu Val Tyr Ile |      |      |      |      |      |      |
|   | 1125 |      | 1130 |      | 1135 |      |
| Glu Val Glu Asp Val Asn Asp Asn Ala Pro Leu Thr Ser Glu Pro Ile |      |      |      |      |      |      |
|   | 1140 |      | 1145 |      | 1150 |      |
| Tyr Tyr Pro Val Val Met Glu Asn Ser Pro Lys Asp Val Ser Val Ile |      |      |      |      |      |      |
|   | 1155 |      | 1160 |      | 1165 |      |
| Gln Ile Gln Ala Glu Asp Pro Asp Ser Ser Ser Asn Glu Lys Leu Thr |      |      |      |      |      |      |
| 1170  | 1175 |      | 1180 |      |      |      |
| Tyr Arg Ile Thr Ser Gly Asn Pro Gln Asn Phe Phe Ala Ile Asn Ile |      |      |      |      |      |      |
| 1185  | 1190 |      | 1195 |      | 1200 |      |
| Lys Thr Gly Leu Ile Thr Thr Thr Ser Arg Lys Leu Asp Arg Glu Gln |      |      |      |      |      |      |
|   | 1205 |      | 1210 |      | 1215 |      |
| Gln Ala Glu His Phe Leu Glu Val Thr Val Thr Asp Gly Gly Pro Ser |      |      |      |      |      |      |
|   | 1220 |      | 1225 |      | 1230 |      |
| Pro Lys Gln Ser Thr Ile Trp Val Val Val Gln Val Leu Asp Glu Asn |      |      |      |      |      |      |
|   | 1235 |      | 1240 |      | 1245 |      |
| Asp Asn Lys Pro Gln Phe Pro Glu Lys Val Tyr Gln Ile Lys Leu Pro |      |      |      |      |      |      |
|   | 1250 |      | 1255 |      | 1260 |      |
| Glu Arg Asp Arg Lys Lys Arg Gly Glu Pro Ile Tyr Arg Ala Phe Ala |      |      |      |      |      |      |
| 1265  | 1270 |      | 1275 |      | 1280 |      |
| Phe Asp Arg Asp Glu Gly Pro Asn Ala Glu Ile Ser Tyr Ser Ile Val |      |      |      |      |      |      |
|   | 1285 |      | 1290 |      | 1295 |      |
| Asp Gly Asn Asp Asp Gly Lys Phe Phe Ile Asp Pro Lys Thr Gly Met |      |      |      |      |      |      |
|   | 1300 |      | 1305 |      | 1310 |      |
| Val Ser Ser Arg Lys Gln Phe Thr Ala Gly Ser Tyr Asp Ile Leu Thr |      |      |      |      |      |      |
|   | 1315 |      | 1320 |      | 1325 |      |
| Ile Lys Ala Val Asp Asn Gly Arg Pro Gln Lys Ser Ser Thr Ala Arg |      |      |      |      |      |      |
|   | 1330 |      | 1335 |      | 1340 |      |
| Leu His Ile Glu Trp Ile Lys Lys Pro Pro Pro Ser Pro Ile Pro Leu |      |      |      |      |      |      |
| 1345  | 1350 |      | 1355 |      | 1360 |      |
| Thr Phe Asp Glu Pro Phe Tyr Asn Phe Thr Val Met Glu Ser Asp Arg |      |      |      |      |      |      |
|   | 1365 |      | 1370 |      | 1375 |      |
| Val Thr Glu Ile Val Gly Val Val Ser Val Gln Pro Ala Asn Thr Pro |      |      |      |      |      |      |
|   | 1380 |      | 1385 |      | 1390 |      |
| Leu Trp Phe Asp Ile Val Gly Gly Asn Phe Asp Ser Ala Phe Asp Ala |      |      |      |      |      |      |
|   | 1395 |      | 1400 |      | 1405 |      |
| Glu Lys Gly Val Gly Thr Ile Val Ile Ala Lys Pro Leu Asp Ala Glu |      |      |      |      |      |      |
|   | 1410 |      | 1415 |      | 1420 |      |
| Gln Arg Ser Ile Tyr Asn Met Ser Val Glu Val Thr Asp Gly Thr Asn |      |      |      |      |      |      |
| 1425  | 1430 |      | 1435 |      | 1440 |      |
| Val Ala Val Thr Gln Val Phe Ile Lys Val Leu Asp Asn Asn Asp Asn |      |      |      |      |      |      |
|   | 1445 |      | 1450 |      | 1455 |      |
| Gly Pro Glu Phe Ser Gln Pro Asn Tyr Asp Val Thr Ile Ser Glu Asp |      |      |      |      |      |      |
|   | 1460 |      | 1465 |      | 1470 |      |
| Val Leu Pro Asp Thr Glu Ile Leu Gln Ile Glu Ala Thr Asp Arg Asp |      |      |      |      |      |      |

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|   |      |      |
|---|------|------|
| 1475  | 1480 | 1485 |
| Glu Lys His Lys Leu Ser Tyr Thr Val His Ser Ser Ile Asp Ser Ile |      |      |
| 1490  | 1495 | 1500 |
| Ser Met Arg Lys Phe Arg Ile Asp Pro Ser Thr Gly Val Leu Tyr Thr |      |      |
| 1505  | 1510 | 1515 |
| Ala Glu Arg Leu Asp His Glu Ala Gln Asp Lys His Ile Leu Asn Ile |      |      |
| 1525  | 1530 | 1535 |
| Met Val Arg Asp Gln Glu Phe Pro Tyr Arg Arg Asn Leu Ala Arg Val |      |      |
| 1540  | 1545 | 1550 |
| Ile Val Asn Val Glu Asp Ala Asn Asp His Ser Pro Tyr Phe Thr Asn |      |      |
| 1555  | 1560 | 1565 |
| Pro Leu Tyr Glu Ala Ser Val Phe Glu Ser Ala Ala Leu Gly Ser Ala |      |      |
| 1570  | 1575 | 1580 |
| Val Leu Gln Val Thr Ala Leu Asp Lys Asp Lys Gly Glu Asn Ala Glu |      |      |
| 1585  | 1590 | 1595 |
| Leu Ile Tyr Thr Ile Glu Ala Gly Asn Thr Gly Asn Met Phe Lys Ile |      |      |
| 1605  | 1610 | 1615 |
| Glu Pro Val Leu Gly Ile Ile Thr Ile Cys Lys Glu Pro Asp Met Thr |      |      |
| 1620  | 1625 | 1630 |
| Thr Met Gly Gln Phe Val Leu Ser Ile Lys Val Thr Asp Gln Gly Ser |      |      |
| 1635  | 1640 | 1645 |
| Pro Pro Met Ser Ala Thr Ala Ile Val Arg Ile Ser Val Thr Met Ser |      |      |
| 1650  | 1655 | 1660 |
| Asp Asn Ser His Pro Lys Phe Ile His Lys Asp Tyr Gln Ala Glu Val |      |      |
| 1665  | 1670 | 1675 |
| Asn Glu Asn Val Asp Ile Gly Thr Ser Val Ile Leu Ile Ser Ala Ile |      |      |
| 1685  | 1690 | 1695 |
| Ser Gln Ser Thr Leu Ile Tyr Glu Val Lys Asp Gly Asp Ile Asn Gly |      |      |
| 1700  | 1705 | 1710 |
| Ile Phe Thr Ile Asn Pro Tyr Ser Gly Val Ile Thr Thr Gln Lys Ala |      |      |
| 1715  | 1720 | 1725 |
| Leu Asp Tyr Glu Arg Thr Ser Ser Tyr Gln Leu Ile Ile Gln Ala Thr |      |      |
| 1730  | 1735 | 1740 |
| Asn Met Ala Gly Met Ala Ser Asn Ala Thr Val Asn Ile Gln Ile Val |      |      |
| 1745  | 1750 | 1755 |
| Asp Glu Asn Asp Asn Ala Pro Val Phe Leu Phe Ser Gln Tyr Ser Gly |      |      |
| 1765  | 1770 | 1775 |
| Ser Leu Ser Glu Ala Ala Pro Ile Asn Ser Ile Val Arg Ser Leu Asp |      |      |
| 1780  | 1785 | 1790 |
| Asn Ser Pro Leu Val Ile Arg Ala Thr Asp Ala Asp Ser Asn Arg Asn |      |      |
| 1795  | 1800 | 1805 |
| Ala Leu Leu Val Tyr Gln Ile Val Glu Ser Thr Ala Lys Lys Phe Phe |      |      |
| 1810  | 1815 | 1820 |
| Thr Val Asp Ser Ser Thr Gly Ala Ile Arg Thr Ile Ala Asn Leu Asp |      |      |
| 1825  | 1830 | 1835 |
| His Glu Thr Ile Ala His Phe His Phe His Val His Val Arg Asp Ser |      |      |
| 1845  | 1850 | 1855 |
| Gly Ser Pro Gln Leu Thr Ala Glu Ser Pro Val Glu Val Asn Ile Glu |      |      |
| 1860  | 1865 | 1870 |
| Val Thr Asp Val Asn Asp Asn Pro Pro Val Phe Thr Gln Ala Val Phe |      |      |
| 1875  | 1880 | 1885 |
| Glu Thr Ile Leu Leu Leu Pro Thr Tyr Val Gly Val Glu Val Leu Lys |      |      |
| 1890  | 1895 | 1900 |
| Val Ser Ala Thr Asp Pro Asp Ser Glu Val Pro Pro Glu Leu Thr Tyr |      |      |
| 1905  | 1910 | 1915 |
| Ser Leu Met Glu Gly Ser Leu Asp His Phe Leu Ile Asp Ser Asn Ser |      |      |

|     |     |     |     |      |     |     |     |     |      |     |     |     |     |      |
|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|-----|------|
|     |     |     |     | 1925 |     |     |     |     | 1930 |     |     |     |     | 1935 |
| Gly | Val | Leu | Thr | Ile  | Lys | Asn | Asn | Asn | Leu  | Ser | Lys | Asp | His | Tyr  |
|     |     |     |     | 1940 |     |     |     |     | 1945 |     |     |     |     | 1950 |
| Leu | Ile | Val | Lys | Val  | Ser | Asp | Gly | Lys | Phe  | Tyr | Ser | Thr | Ser | Met  |
|     |     |     |     | 1955 |     |     |     |     | 1960 |     |     |     |     | 1965 |
| Thr | Ile | Met | Val | Lys  | Glu | Ala | Met | Asp | Ser  | Gly | Leu | His | Phe | Thr  |
|     |     |     |     | 1970 |     |     |     |     | 1975 |     |     |     |     | 1980 |
| Ser | Phe | Tyr | Ser | Thr  | Ser | Ile | Ser | Glu | Asn  | Asn | Thr | Asn | Ile | Thr  |
|     |     |     |     |      |     |     |     |     |      |     |     |     |     | 2000 |
| Val | Ala | Ile | Val | Asn  | Ala | Val | Gly | Asn | Arg  | Leu | Asn | Glu | Pro | Leu  |
|     |     |     |     |      |     |     |     |     |      |     |     |     |     | 2015 |
| Tyr | Ser | Ile | Leu | Asn  | Pro | Gly | Asn | Lys | Phe  | Lys | Ile | Lys | Ser | Thr  |
|     |     |     |     |      |     |     |     |     |      |     |     |     |     | 2030 |
| Gly | Val | Ile | Gln | Thr  | Thr | Gly | Val | Pro | Phe  | Asp | Arg | Glu | Glu | Gln  |
|     |     |     |     |      |     |     |     |     |      |     |     |     |     | 2045 |
| Leu | Tyr | Glu | Leu | Val  | Val | Glu | Ala | Ser | Arg  | Glu | Leu | Asp | His | Leu  |
|     |     |     |     |      |     |     |     |     |      |     |     |     |     | 2060 |
| Val | Ala | Arg | Val | Val  | Val | Arg | Val | Asn | Ile  | Glu | Asp | Ile | Asn | Asp  |
|     |     |     |     |      |     |     |     |     |      |     |     |     |     | 2080 |
| Ser | Pro | Val | Phe | Val  | Gly | Leu | Pro | Tyr | Tyr  | Ala | Ala | Val | Gln | Val  |
|     |     |     |     |      |     |     |     |     |      |     |     |     |     | 2095 |
| Ala | Glu | Pro | Gly | Thr  | Leu | Ile | Tyr | Gln | Val  | Thr | Ala | Ile | Asp | Lys  |
|     |     |     |     |      |     |     |     |     |      |     |     |     |     | 2110 |
| Lys | Gly | Pro | Asn | Gly  | Glu | Val | Thr | Tyr | Val  | Leu | Gln | Asp | Asp | Tyr  |
|     |     |     |     |      |     |     |     |     |      |     |     |     |     | 2125 |
| His | Phe | Glu | Ile | Asn  | Pro | Asn | Ser | Gly | Asn  | Val | Ile | Leu | Lys | Glu  |
|     |     |     |     |      |     |     |     |     |      |     |     |     |     | 2140 |
| Phe | Asn | Ser | Asp | Leu  | Ser | Asn | Ile | Glu | Tyr  | Gly | Val | Thr | Ile | Leu  |
|     |     |     |     |      |     |     |     |     |      |     |     |     |     | 2160 |
| Lys | Asp | Gly | Gly | Lys  | Pro | Ser | Leu | Ser | Thr  | Ser | Val | Glu | Leu | Pro  |
|     |     |     |     |      |     |     |     |     |      |     |     |     |     | 2175 |
| Thr | Ile | Val | Asn | Lys  | Ala | Met | Pro | Val | Phe  | Asp | Lys | Pro | Phe | Tyr  |
|     |     |     |     |      |     |     |     |     |      |     |     |     |     | 2190 |
| Ala | Ser | Val | Asn | Glu  | Asp | Ile | Arg | Met | Asn  | Thr | Pro | Ile | Leu | Ser  |
|     |     |     |     |      |     |     |     |     |      |     |     |     |     | 2205 |
| Asn | Ala | Thr | Ser | Pro  | Glu | Gly | Gln | Gly | Ile  | Ile | Tyr | Ile | Ile | Ile  |
|     |     |     |     |      |     |     |     |     |      |     |     |     |     | 2220 |
| Gly | Asp | Pro | Phe | Lys  | Gln | Phe | Asn | Ile | Asp  | Phe | Asp | Thr | Gly | Val  |
|     |     |     |     |      |     |     |     |     |      |     |     |     |     | 2240 |
| Lys | Val | Val | Ser | Pro  | Leu | Asp | Tyr | Glu | Val  | Thr | Ser | Ala | Tyr | Lys  |
|     |     |     |     |      |     |     |     |     |      |     |     |     |     | 2255 |
| Thr | Ile | Arg | Ala | Ser  | Asp | Ala | Leu | Thr | Gly  | Ala | Arg | Ala | Glu | Val  |
|     |     |     |     |      |     |     |     |     |      |     |     |     |     | 2270 |
| Val | Asp | Leu | Leu | Val  | Asn | Asp | Val | Asn | Asp  | Asn | Pro | Pro | Ile | Phe  |
|     |     |     |     |      |     |     |     |     |      |     |     |     |     | 2285 |
| Gln | Pro | Thr | Tyr | Asn  | Thr | Thr | Leu | Ser | Glu  | Ala | Ser | Leu | Ile | Gly  |
|     |     |     |     |      |     |     |     |     |      |     |     |     |     | 2300 |
| Pro | Val | Leu | Gln | Val  | Val | Ser | Ile | Asp | Ala  | Asp | Ser | Glu | Asn | Asn  |
|     |     |     |     |      |     |     |     |     |      |     |     |     |     | 2320 |
| Met | Val | His | Tyr | Gln  | Ile | Val | Gln | Asp | Thr  | Tyr | Asn | Ser | Thr | Asp  |
|     |     |     |     |      |     |     |     |     |      |     |     |     |     | 2335 |
| Phe | His | Ile | Asp | Ser  | Ser | Ser | Gly | Leu | Ile  | Leu | Thr | Ala | Arg | Met  |
|     |     |     |     |      |     |     |     |     |      |     |     |     |     | 2350 |
| Asp | His | Glu | Leu | Val  | Gln | His | Cys | Thr | Leu  | Lys | Val | Arg | Ser | Ile  |
|     |     |     |     |      |     |     |     |     |      |     |     |     |     | 2365 |
| Ser | Gly | Phe | Pro | Ser  | Leu | Ser | Ser | Glu | Val  | Leu | Val | His | Ile | Tyr  |



|   |      |      |
|---|------|------|
| 2370  | 2375 | 2380 |
| Ser Asp Val Asn Asp Asn Pro Pro Val Phe Asn Gln Leu Ile Tyr Glu |      |      |
| 2385  | 2390 | 2395 |
| Ser Tyr Val Ser Glu Leu Ala Pro Arg Gly His Phe Val Thr Cys Val |      | 2400 |
|   | 2405 | 2410 |
| Gln Ala Ser Asp Ala Asp Ser Ser Asp Phe Asp Arg Leu Glu Tyr Ser |      | 2415 |
|   | 2420 | 2425 |
| Ile Leu Ser Gly Asn Asp Arg Thr Ser Phe Leu Met Asp Ser Lys Ser |      | 2430 |
|   | 2435 | 2440 |
| Gly Val Ile Thr Leu Ser Asn His Arg Lys Gln Arg Met Glu Pro Leu |      | 2445 |
|   | 2450 | 2455 |
| Tyr Ser Leu Asn Val Ser Val Ser Asp Gly Leu Phe Thr Ser Thr Ala |      | 2460 |
| 2465  | 2470 | 2475 |
| Gln Val His Ile Arg Val Leu Gly Ala Asn Leu Tyr Ser Pro Ala Phe |      | 2480 |
|   | 2485 | 2490 |
| Ser Gln Ser Thr Tyr Val Ala Glu Val Arg Glu Asn Val Ala Ala Gly |      | 2495 |
|   | 2500 | 2505 |
| Thr Lys Val Ile His Val Arg Ala Thr Asp Gly Asp Pro Gly Thr Tyr |      | 2510 |
|   | 2515 | 2520 |
| Gly Gln Ile Ser Tyr Ala Ile Ile Asn Asp Phe Ala Lys Asp Arg Phe |      | 2525 |
|   | 2530 | 2535 |
| Leu Ile Asp Ser Asn Gly Gln Val Ile Thr Thr Glu Arg Leu Asp Arg |      | 2540 |
| 2545  | 2550 | 2555 |
| Glu Asn Pro Leu Glu Gly Asp Val Ser Ile Phe Val Arg Ala Leu Asp |      | 2560 |
|   | 2565 | 2570 |
| Gly Gly Gly Arg Thr Thr Phe Cys Thr Val Arg Val Ile Val Val Asp |      | 2575 |
|   | 2580 | 2585 |
| Glu Asn Asp Asn Ala Pro Gln Phe Met Thr Val Glu Tyr Arg Ala Ser |      | 2590 |
|   | 2595 | 2600 |
| Val Arg Ala Asp Val Gly Arg Gly His Leu Val Thr Gln Val Gln Ala |      | 2605 |
|   | 2610 | 2615 |
| Ile Asp Pro Asp Asp Gly Ala Asn Ser Arg Ile Thr Tyr Ser Leu Tyr |      | 2620 |
| 2625  | 2630 | 2635 |
| Ser Glu Ala Ser Val Ser Val Ala Asp Leu Leu Glu Ile Asp Pro Asp |      | 2640 |
|   | 2645 | 2650 |
| Asn Gly Trp Met Val Thr Lys Gly Asn Phe Asn Gln Leu Lys Asn Thr |      | 2655 |
|   | 2660 | 2665 |
| Val Leu Ser Phe Phe Val Lys Ala Val Asp Gly Gly Ile Pro Val Lys |      | 2670 |
|   | 2675 | 2680 |
| His Ser Leu Ile Pro Val Tyr Ile His Val Leu Pro Pro Glu Thr Phe |      | 2685 |
|   | 2690 | 2695 |
| Leu Pro Ser Phe Thr Gln Ser Gln Tyr Ser Phe Thr Ile Ala Glu Asp |      | 2700 |
| 2705  | 2710 | 2715 |
| Thr Ala Ile Gly Ser Thr Val Asp Thr Leu Arg Ile Leu Pro Ser Gln |      | 2720 |
|   | 2725 | 2730 |
| Asn Val Trp Phe Ser Thr Val Asn Gly Glu Arg Pro Glu Asn Asn Lys |      | 2735 |
|   | 2740 | 2745 |
| Gly Gly Val Phe Val Ile Glu Gln Glu Thr Gly Thr Ile Lys Leu Asp |      | 2750 |
|   | 2755 | 2760 |
| Lys Arg Leu Asp Arg Glu Thr Ser Pro Ala Phe His Phe Lys Val Ala |      | 2765 |
|   | 2770 | 2775 |
| Ala Thr Ile Pro Leu Asp Lys Val Asp Ile Val Phe Thr Val Asp Val |      | 2780 |
| 2785  | 2790 | 2795 |
| Asp Ile Lys Val Leu Asp Leu Asn Asp Asn Lys Pro Val Phe Glu Thr |      | 2800 |
|   | 2805 | 2810 |
| Ser Ser Tyr Asp Thr Ile Ile Met Glu Gly Met Pro Val Gly Thr Lys |      | 2815 |

|   |      |      |
|---|------|------|
| 2820  | 2825 | 2830 |
| Leu Thr Gln Val Arg Ala Ile Asp Met Asp Trp Gly Ala Asn Gly Gln |      |      |
| 2835  | 2840 | 2845 |
| Val Thr Tyr Ser Leu His Ser Asp Ser Gln Pro Glu Lys Val Met Glu |      |      |
| 2850  | 2855 | 2860 |
| Ala Phe Asn Ile Asp Ser Asn Thr Gly Trp Ile Ser Thr Leu Lys Asp |      |      |
| 2865  | 2870 | 2875 |
| Leu Asp His Glu Thr Asp Pro Thr Phe Thr Phe Ser Val Val Ala Ser |      |      |
| 2885  | 2890 | 2895 |
| Asp Leu Gly Glu Ala Phe Ser Leu Ser Ser Thr Ala Leu Val Ser Val |      |      |
| 2900  | 2905 | 2910 |
| Arg Val Thr Asp Ile Asn Asp Asn Ala Pro Val Phe Ala Gln Glu Val |      |      |
| 2915  | 2920 | 2925 |
| Tyr Arg Gly Asn Val Lys Glu Ser Asp Pro Pro Gly Glu Val Val Ala |      |      |
| 2930  | 2935 | 2940 |
| Val Leu Ser Thr Trp Asp Arg Asp Thr Ser Asp Val Asn Arg Gln Val |      |      |
| 2945  | 2950 | 2955 |
| Ser Tyr His Ile Thr Gly Gly Asn Pro Arg Gly Arg Phe Ala Leu Gly |      |      |
| 2965  | 2970 | 2975 |
| Leu Val Gln Ser Glu Trp Lys Val Tyr Val Lys Arg Pro Leu Asp Arg |      |      |
| 2980  | 2985 | 2990 |
| Glu Glu Gln Asp Ile Tyr Phe Leu Asn Ile Thr Ala Thr Asp Gly Leu |      |      |
| 2995  | 3000 | 3005 |
| Phe Val Thr Gln Ala Met Val Glu Val Ser Val Ser Asp Val Asn Asp |      |      |
| 3010  | 3015 | 3020 |
| Asn Ser Pro Val Cys Asp Gln Val Ala Tyr Thr Ala Leu Leu Pro Glu |      |      |
| 3025  | 3030 | 3035 |
| Asp Ile Pro Ser Asn Lys Ile Ile Leu Lys Val Ser Ala Lys Asp Ala |      |      |
| 3045  | 3050 | 3055 |
| Asp Ile Gly Ser Asn Gly Tyr Ile Arg Tyr Ser Leu Tyr Gly Ser Gly |      |      |
| 3060  | 3065 | 3070 |
| Asn Ser Glu Phe Phe Leu Asp Pro Glu Ser Gly Glu Leu Lys Thr Leu |      |      |
| 3075  | 3080 | 3085 |
| Ala Leu Leu Asp Arg Glu Arg Ile Pro Val Tyr Ser Leu Met Ala Lys |      |      |
| 3090  | 3095 | 3100 |
| Ala Thr Asp Gly Gly Gly Arg Phe Cys Gln Ser Asn Ile His Leu Ile |      |      |
| 3105  | 3110 | 3115 |
| Leu Glu Asp Val Asn Asp Asn Pro Pro Val Phe Ser Ser Asp His Tyr |      |      |
| 3125  | 3130 | 3135 |
| Asn Thr Cys Val Tyr Glu Asn Thr Ala Thr Lys Ala Leu Leu Thr Arg |      |      |
| 3140  | 3145 | 3150 |
| Val Gln Ala Val Asp Pro Asp Ile Gly Ile Asn Arg Lys Val Val Tyr |      |      |
| 3155  | 3160 | 3165 |
| Ser Leu Ala Asp Ser Ala Gly Gly Val Phe Ser Ile Asp Ser Ser Ser |      |      |
| 3170  | 3175 | 3180 |
| Gly Ile Ile Ile Leu Glu Gln Pro Leu Asp Arg Glu Gln Gln Ser Ser |      |      |
| 3185  | 3190 | 3195 |
| Tyr Asn Ile Ser Val Arg Ala Thr Asp Gln Ser Pro Gly Gln Ser Leu |      |      |
| 3205  | 3210 | 3215 |
| Ser Ser Leu Thr Thr Val Thr Ile Thr Val Leu Asp Ile Asn Asp Asn |      |      |
| 3220  | 3225 | 3230 |
| Pro Pro Val Phe Glu Arg Arg Asp Tyr Leu Val Thr Val Pro Glu Asp |      |      |
| 3235  | 3240 | 3245 |
| Thr Ser Pro Gly Thr Gln Val Leu Ala Val Phe Ala Thr Ser Lys Asp |      |      |
| 3250  | 3255 | 3260 |
| Ile Gly Thr Asn Ala Glu Ile Thr Tyr Leu Ile Arg Ser Gly Asn Glu |      |      |

|   |      |      |      |
|---|------|------|------|
| 3265  | 3270 | 3275 | 3280 |
| Gln Gly Lys Phe Lys Ile Asn Pro Lys Thr Gly Gly Ile Ser Val Ser |      |      |      |
|   | 3285 | 3290 | 3295 |
| Glu Val Leu Asp Tyr Glu Leu Cys Lys Arg Phe Tyr Leu Val Val Glu |      |      |      |
|   | 3300 | 3305 | 3310 |
| Ala Lys Asp Gly Gly Thr Pro Ala Leu Ser Ala Val Ala Thr Val Asn |      |      |      |
|   | 3315 | 3320 | 3325 |
| Ile Asn Leu Thr Asp Val Asn Asp Asn Pro Pro Lys Phe Ser Gln Asp |      |      |      |
|   | 3330 | 3335 | 3340 |
| Val Tyr Ser Ala Val Ile Ser Glu Asp Ala Leu Val Gly Asp Ser Val |      |      |      |
|   | 3345 | 3350 | 3355 |
| Ile Leu Leu Ile Ala Glu Asp Val Asp Ser Gln Pro Asn Gly Gln Ile |      |      |      |
|   | 3365 | 3370 | 3375 |
| His Phe Ser Ile Val Asn Gly Asp Arg Asp Asn Glu Phe Thr Val Asp |      |      |      |
|   | 3380 | 3385 | 3390 |
| Pro Val Leu Gly Leu Val Lys Val Lys Lys Lys Leu Asp Arg Glu Arg |      |      |      |
|   | 3395 | 3400 | 3405 |
| Val Ser Gly Tyr Ser Leu Leu Val Gln Ala Val Asp Ser Gly Ile Pro |      |      |      |
|   | 3410 | 3415 | 3420 |
| Ala Met Ser Ser Thr Ala Thr Val Asn Ile Asp Ile Ser Asp Val Asn |      |      |      |
|   | 3425 | 3430 | 3435 |
| Asp Asn Ser Pro Val Phe Thr Pro Ala Asn Tyr Thr Ala Val Ile Gln |      |      |      |
|   | 3445 | 3450 | 3455 |
| Glu Asn Lys Pro Val Gly Thr Ser Ile Leu Gln Leu Val Val Thr Asp |      |      |      |
|   | 3460 | 3465 | 3470 |
| Arg Asp Ser Phe His Asn Gly Pro Pro Phe Ser Phe Ser Ile Leu Ser |      |      |      |
|   | 3475 | 3480 | 3485 |
| Gly Asn Glu Glu Glu Glu Phe Val Leu Asp Pro His Gly Ile Leu Arg |      |      |      |
|   | 3490 | 3495 | 3500 |
| Ser Ala Val Val Phe Gln His Thr Glu Ser Leu Glu Tyr Val Leu Cys |      |      |      |
|   | 3505 | 3510 | 3515 |
| Val Gln Ala Lys Asp Ser Gly Lys Pro Gln Gln Val Ser His Thr Tyr |      |      |      |
|   | 3525 | 3530 | 3535 |
| Ile Arg Val Arg Val Ile Glu Glu Ser Thr His Lys Pro Thr Ala Ile |      |      |      |
|   | 3540 | 3545 | 3550 |
| Pro Leu Glu Ile Phe Ile Val Thr Met Glu Asp Asp Phe Pro Gly Gly |      |      |      |
|   | 3555 | 3560 | 3565 |
| Val Ile Gly Lys Ile His Ala Thr Asp Gln Asp Met Tyr Asp Val Leu |      |      |      |
|   | 3570 | 3575 | 3580 |
| Thr Phe Ala Leu Lys Ser Glu Gln Lys Ser Leu Phe Lys Val Asn Ser |      |      |      |
|   | 3585 | 3590 | 3595 |
| His Asp Gly Lys Ile Ile Ala Leu Gly Gly Leu Asp Ser Gly Lys Tyr |      |      |      |
|   | 3605 | 3610 | 3615 |
| Val Leu Asn Val Ser Val Ser Asp Gly Arg Phe Gln Val Pro Ile Asp |      |      |      |
|   | 3620 | 3625 | 3630 |
| Val Val Val His Val Glu Gln Leu Val His Glu Met Leu Gln Asn Thr |      |      |      |
|   | 3635 | 3640 | 3645 |
| Val Thr Ile Arg Phe Glu Asn Val Ser Pro Glu Asp Phe Val Gly Leu |      |      |      |
|   | 3650 | 3655 | 3660 |
| His Met His Gly Phe Arg Arg Thr Leu Arg Asn Ala Val Leu Thr Gln |      |      |      |
|   | 3665 | 3670 | 3675 |
| Lys Gln Asp Ser Leu Arg Ile Ile Ser Ile Gln Pro Val Ala Gly Thr |      |      |      |
|   | 3685 | 3690 | 3695 |
| Asn Gln Leu Asp Met Leu Phe Ala Val Glu Met His Ser Ser Glu Phe |      |      |      |
|   | 3700 | 3705 | 3710 |
| Tyr Lys Pro Ala Tyr Leu Ile Gln Lys Leu Ser Asn Ala Arg Arg His |      |      |      |

|   |      |      |
|---|------|------|
| 3715  | 3720 | 3725 |
| Leu Glu Asn Ile Met Arg Ile Ser Ala Ile Leu Glu Lys Asn Cys Ser |      |      |
| 3730  | 3735 | 3740 |
| Gly Leu Asp Cys Gln Glu Gln His Cys Glu Gln Gly Leu Ser Leu Asp |      |      |
| 3745  | 3750 | 3755 |
| Ser His Ala Leu Met Thr Tyr Ser Thr Ala Arg Ile Ser Phe Val Cys |      |      |
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| Pro Arg Phe Tyr Arg Asn Val Arg Cys Thr Cys Asn Gly Gly Leu Cys |      |      |
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| Pro Gly Ser Asn Asp Pro Cys Val Glu Lys Pro Cys Pro Gly Asp Met |      |      |
| 3795  | 3800 | 3805 |
| Gln Cys Val Gly Tyr Glu Ala Ser Arg Arg Pro Phe Leu Cys Gln Cys |      |      |
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| Pro Pro Gly Lys Leu Gly Glu Cys Ser Gly His Thr Ser Leu Ser Phe |      |      |
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 <212> PRT  
 <213> homo sapiens

<400> 6

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|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | Gly | His | Cys | Val | Gly | Thr | Arg | Pro | Pro | Ala | Cys | Cys | Leu | Ile | Leu |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |     |
| Leu | Leu | Phe | Lys | Leu | Leu | Ala | Thr | Val | Ser | Gln | Gly | Leu | Pro | Gly | Thr |
|     |     |     | 20  |     |     |     |     | 25  |     |     |     |     | 30  |     |     |
| Gly | Pro | Leu | Gly | Phe | His | Phe | Thr | His | Ser | Ile | Tyr | Asn | Ala | Thr | Val |
|     |     |     | 35  |     |     |     | 40  |     |     |     |     | 45  |     |     |     |
| Tyr | Glu | Asn | Ser | Ala | Ala | Arg | Thr | Tyr | Val | Asn | Ser | Gln | Ser | Arg | Met |
|     | 50  |     |     |     |     | 55  |     |     |     | 60  |     |     |     |     |     |
| Gly | Ile | Thr | Leu | Ile | Asp | Leu | Ser | Trp | Asp | Ile | Lys | Tyr | Arg | Ile | Val |
| 65  |     |     |     | 70  |     |     |     |     | 75  |     |     |     | 80  |     |     |
| Ser | Gly | Asp | Glu | Glu | Gly | Phe | Phe | Lys | Ala | Glu | Glu | Val | Ile | Ile | Ala |
|     |     |     | 85  |     |     |     |     | 90  |     |     |     |     | 95  |     |     |
| Asp | Phe | Cys | Phe | Leu | Arg | Ile | Arg | Thr | Lys | Gly | Gly | Asn | Ser | Ala | Ile |
|     |     |     | 100 |     |     |     | 105 |     |     |     |     | 110 |     |     |     |
| Leu | Asn | Arg | Glu | Ile | Gln | Asp | Asn | Tyr | Leu | Leu | Ile | Val | Lys | Gly | Ser |
|     | 115 |     |     |     |     | 120 |     |     |     |     | 125 |     |     |     |     |
| Val | Arg | Gly | Glu | Asp | Leu | Glu | Ala | Trp | Thr | Lys | Val | Asn | Ile | Gln | Val |



|   |                         |                     |
|---|-------------------------|---------------------|
| 130   | 135                     | 140                 |
| Leu Asp Met Asn Asp   | Leu Arg Pro Leu Phe Ser | Pro Thr Thr Tyr Ser |
| 145   | 150                     | 155                 |
| Val Thr Ile Ala Glu Ser Thr Pro Leu Arg Thr Ser Val Ala Gln Val |                         | 160                 |
|   | 165                     | 170                 |
| Thr Ala Thr Asp Ala Asp Ile Gly Ser Asn Gly Glu Phe Tyr Tyr Tyr |                         | 175                 |
|   | 180                     | 185                 |
| Phe Lys Asn Lys Val Asp Leu Phe Ser Val His Pro Thr Ser Gly Val |                         | 190                 |
|   | 195                     | 200                 |
| Ile Ser Leu Ser Gly Arg Leu Asn Tyr Asp Glu Lys Asn Arg Tyr Asp |                         | 205                 |
|   | 210                     | 215                 |
| Leu Glu Ile Leu Ala Val Asp Arg Gly Met Lys Leu Tyr Gly Asn Asn |                         | 220                 |
| 225   | 230                     | 235                 |
| Gly Val Ser Ser Thr Ala Lys Leu Tyr Val His Ile Glu Arg Ile Asn |                         | 240                 |
|   | 245                     | 250                 |
| Glu His Ala Pro Thr Ile His Val Val Thr His Val Pro Phe Ser Leu |                         | 255                 |
|   | 260                     | 265                 |
| Glu Lys Glu Pro Thr Tyr Ala Val Val Thr Val Asp Asp Leu Asp Asp |                         | 270                 |
|   | 275                     | 280                 |
| Gly Ala Asn Gly Glu Ile Glu Ser Val Ser Ile Val Ala Gly Asp Pro |                         | 285                 |
| 290   | 295                     | 300                 |
| Leu Asp Gln Phe Phe Leu Ala Lys Glu Gly Lys Trp Leu Asn Glu Tyr |                         | 305                 |
| 305   | 310                     | 315                 |
| Lys Ile Lys Glu Arg Lys Gln Ile Asp Trp Glu Ser Phe Pro Tyr Gly |                         | 320                 |
|   | 325                     | 330                 |
| Tyr Asn Leu Thr Leu Gln Ala Lys Asp Lys Gly Ser Pro Gln Lys Cys |                         | 335                 |
|   | 340                     | 345                 |
| Ser Ala Leu Lys Ala Val Tyr Ile Gly Asn Pro Thr Arg Asp Thr Val |                         | 350                 |
|   | 355                     | 360                 |
| Pro Ile Arg Phe Glu Lys Glu Val Tyr Asp Val Ser Ile Ser Glu Phe |                         | 365                 |
|   | 370                     | 375                 |
| Ser Pro Pro Gly Val Val Val Ala Ile Val Lys Leu Ser Pro Glu Pro |                         | 380                 |
| 385   | 390                     | 395                 |
| Ile Asp Val Glu Tyr Lys Leu Ser Pro Gly Glu Asp Ala Val Tyr Phe |                         | 400                 |
|   | 405                     | 410                 |
| Lys Ile Asn Pro Arg Ser Gly Leu Ile Val Thr Ala Arg Pro Leu Asn |                         | 415                 |
|   | 420                     | 425                 |
| Thr Val Lys Lys Glu Val Tyr Lys Leu Glu Val Thr Asn Lys Glu Gly |                         | 430                 |
|   | 435                     | 440                 |
| Asp Leu Lys Ala Gln Val Thr Ile Ser Ile Glu Asp Ala Asn Asp His |                         | 445                 |
|   | 450                     | 455                 |
| Thr Pro Glu Phe Gln Gln Pro Leu Tyr Asp Ala Tyr Val Asn Glu Ser |                         | 460                 |
| 465   | 470                     | 475                 |
| Val Pro Val Gly Thr Ser Val Leu Thr Val Ser Ala Ser Asp Lys Asp |                         | 480                 |
|   | 485                     | 490                 |
| Lys Gly Glu Asn Gly Tyr Ile Thr Tyr Ser Ile Ala Ser Leu Asn Leu |                         | 495                 |
|   | 500                     | 505                 |
| Leu Pro Phe Val Ile Asn Gln Phe Thr Gly Val Ile Ser Thr Thr Glu |                         | 510                 |
|   | 515                     | 520                 |
| Glu Leu Asp Phe Glu Ser Ser Pro Glu Ile Tyr Arg Phe Ile Val Arg |                         | 525                 |
|   | 530                     | 535                 |
| Ala Ser Asp Trp Gly Ser Pro Tyr Arg His Glu Ser Glu Val Asn Val |                         | 540                 |
| 545   | 550                     | 555                 |
| Thr Ile Arg Ile Gly Asn Val Asn Asp Asn Ser Pro Leu Phe Glu Lys |                         | 560                 |
|   | 565                     | 570                 |
| Val Ala Cys Gln Gly Val Ile Ser Tyr Asp Phe Pro Val Gly Gly His |                         | 575                 |

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|      |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 580  |     |     |     |     |     |     |     |     |     | 585  |     |     |     |     |     |     |     |     |     | 590  |     |     |     |     |     |     |     |     |     |     |     |
| Ile  | Thr | Ala | Val | Ser | Ala | Ile | Asp | Ile | Asp | Glu  | Leu | Glu | Leu | Val | Lys | Ile | Asp | Glu | Leu | Glu  | Leu | Val | Lys | Ile | Asp | Glu | Leu | Glu | Leu | Val | Lys |
| 595  |     |     |     |     |     |     |     |     |     | 600  |     |     |     |     |     |     |     |     |     | 605  |     |     |     |     |     |     |     |     |     |     |     |
| Tyr  | Lys | Ile | Ile | Ser | Gly | Asn | Glu | Leu | Gly | Phe  | Phe | Tyr | Leu | Asn | Pro | Tyr | Lys | Ile | Ile | Ser  | Gly | Asn | Glu | Leu | Gly | Phe | Phe | Tyr | Leu | Asn | Pro |
| 610  |     |     |     |     |     |     |     |     |     | 615  |     |     |     |     |     |     |     |     |     | 620  |     |     |     |     |     |     |     |     |     |     |     |
| Asp  | Ser | Gly | Val | Leu | Gln | Leu | Lys | Lys | Ser | Leu  | Thr | Asn | Ser | Gly | Ile | Asp | Ser | Gly | Val | Leu  | Gln | Leu | Lys | Lys | Ser | Leu | Thr | Asn | Ser | Gly | Ile |
| 625  |     |     |     |     |     |     |     |     |     | 630  |     |     |     |     |     |     |     |     |     | 635  |     |     |     |     |     |     |     |     |     |     |     |
| Lys  | Asn | Gly | Asn | Phe | Ala | Leu | Arg | Ile | Thr | Ala  | Thr | Asp | Gly | Glu | Asn | Lys | Asn | Gly | Asn | Phe  | Ala | Leu | Arg | Ile | Thr | Ala | Thr | Asp | Gly | Glu | Asn |
| 645  |     |     |     |     |     |     |     |     |     | 650  |     |     |     |     |     |     |     |     |     | 655  |     |     |     |     |     |     |     |     |     |     |     |
| Leu  | Ala | Asp | Pro | Met | Ser | Ile | Asn | Ile | Ser | Val  | Leu | His | Gly | Lys | Val | Leu | Ala | Asp | Pro | Met  | Ser | Ile | Asn | Ile | Ser | Val | Leu | His | Gly | Lys | Val |
| 660  |     |     |     |     |     |     |     |     |     | 665  |     |     |     |     |     |     |     |     |     | 670  |     |     |     |     |     |     |     |     |     |     |     |
| Ser  | Ser | Lys | Ser | Phe | Ser | Cys | Arg | Glu | Thr | Arg  | Val | Ala | Gln | Lys | Leu | Ser | Ser | Lys | Ser | Phe  | Ser | Cys | Arg | Glu | Thr | Arg | Val | Ala | Gln | Lys | Leu |
| 675  |     |     |     |     |     |     |     |     |     | 680  |     |     |     |     |     |     |     |     |     | 685  |     |     |     |     |     |     |     |     |     |     |     |
| Ala  | Glu | Lys | Leu | Leu | Ile | Lys | Ala | Lys | Ala | Asn  | Gly | Lys | Leu | Asn | Leu | Ala | Glu | Lys | Leu | Leu  | Ile | Lys | Ala | Lys | Ala | Asn | Gly | Lys | Leu | Asn | Leu |
| 690  |     |     |     |     |     |     |     |     |     | 695  |     |     |     |     |     |     |     |     |     | 700  |     |     |     |     |     |     |     |     |     |     |     |
| Glu  | Asp | Gly | Phe | Leu | Asp | Phe | Tyr | Ser | Ile | Asn  | Arg | Gln | Gly | Pro | Tyr | Glu | Asp | Gly | Phe | Leu  | Asp | Phe | Tyr | Ser | Ile | Asn | Arg | Gln | Gly | Pro | Tyr |
| 705  |     |     |     |     |     |     |     |     |     | 710  |     |     |     |     |     |     |     |     |     | 715  |     |     |     |     |     |     |     |     |     |     |     |
| Phe  | Asp | Lys | Ser | Phe | Pro | Ser | Asp | Val | Ala | Val  | Lys | Glu | Asp | Leu | Pro | Phe | Asp | Lys | Ser | Phe  | Pro | Ser | Asp | Val | Ala | Val | Lys | Glu | Asp | Leu | Pro |
| 725  |     |     |     |     |     |     |     |     |     | 730  |     |     |     |     |     |     |     |     |     | 735  |     |     |     |     |     |     |     |     |     |     |     |
| Val  | Gly | Ala | Asn | Ile | Leu | Lys | Ile | Lys | Ala | Tyr  | Asp | Ala | Asp | Ser | Gly | Val | Gly | Ala | Asn | Ile  | Leu | Lys | Ile | Lys | Ala | Tyr | Asp | Ala | Asp | Ser | Gly |
| 740  |     |     |     |     |     |     |     |     |     | 745  |     |     |     |     |     |     |     |     |     | 750  |     |     |     |     |     |     |     |     |     |     |     |
| Phe  | Asn | Gly | Lys | Val | Leu | Phe | Thr | Ile | Ser | Asp  | Gly | Asn | Thr | Asp | Ser | Phe | Asn | Gly | Lys | Val  | Leu | Phe | Thr | Ile | Ser | Asp | Gly | Asn | Thr | Asp | Ser |
| 755  |     |     |     |     |     |     |     |     |     | 760  |     |     |     |     |     |     |     |     |     | 765  |     |     |     |     |     |     |     |     |     |     |     |
| Cys  | Phe | Asn | Ile | Asp | Met | Glu | Thr | Gly | Gln | Leu  | Lys | Val | Leu | Met | Pro | Cys | Phe | Asn | Ile | Asp  | Met | Glu | Thr | Gly | Gln | Leu | Lys | Val | Leu | Met | Pro |
| 770  |     |     |     |     |     |     |     |     |     | 775  |     |     |     |     |     |     |     |     |     | 780  |     |     |     |     |     |     |     |     |     |     |     |
| Met  | Asp | Arg | Glu | His | Thr | Asp | Leu | Tyr | Leu | Leu  | Asn | Ile | Thr | Ile | Tyr | Met | Asp | Arg | Glu | His  | Thr | Asp | Leu | Tyr | Leu | Leu | Asn | Ile | Thr | Ile | Tyr |
| 785  |     |     |     |     |     |     |     |     |     | 790  |     |     |     |     |     |     |     |     |     | 795  |     |     |     |     |     |     |     |     |     |     |     |
| Asp  | Leu | Gly | Asn | Pro | Gln | Lys | Ser | Ser | Trp | Arg  | Leu | Leu | Thr | Ile | Asn | Asp | Leu | Gly | Asn | Pro  | Gln | Lys | Ser | Ser | Trp | Arg | Leu | Leu | Thr | Ile | Asn |
| 805  |     |     |     |     |     |     |     |     |     | 810  |     |     |     |     |     |     |     |     |     | 815  |     |     |     |     |     |     |     |     |     |     |     |
| Val  | Glu | Asp | Ala | Asn | Asp | Asn | Ser | Pro | Val | Phe  | Ile | Gln | Asp | Ser | Tyr | Val | Glu | Asp | Ala | Asn  | Asp | Asn | Ser | Pro | Val | Phe | Ile | Gln | Asp | Ser | Tyr |
| 820  |     |     |     |     |     |     |     |     |     | 825  |     |     |     |     |     |     |     |     |     | 830  |     |     |     |     |     |     |     |     |     |     |     |
| Ser  | Val | Asn | Ile | Leu | Glu | Ser | Ser | Gly | Ile | Gly  | Thr | Glu | Ile | Ile | Gln | Ser | Val | Asn | Ile | Leu  | Glu | Ser | Ser | Gly | Ile | Gly | Thr | Glu | Ile | Ile | Gln |
| 835  |     |     |     |     |     |     |     |     |     | 840  |     |     |     |     |     |     |     |     |     | 845  |     |     |     |     |     |     |     |     |     |     |     |
| Val  | Glu | Ala | Arg | Asp | Lys | Asp | Leu | Gly | Ser | Asn  | Gly | Glu | Val | Thr | Tyr | Val | Glu | Ala | Arg | Asp  | Lys | Asp | Leu | Gly | Ser | Asn | Gly | Glu | Val | Thr | Tyr |
| 850  |     |     |     |     |     |     |     |     |     | 855  |     |     |     |     |     |     |     |     |     | 860  |     |     |     |     |     |     |     |     |     |     |     |
| Ser  | Val | Leu | Thr | Asp | Thr | Gln | Gln | Phe | Ala | Ile  | Asn | Ser | Ser | Thr | Gly | Ser | Val | Leu | Thr | Asp  | Thr | Gln | Gln | Phe | Ala | Ile | Asn | Ser | Ser | Thr | Gly |
| 865  |     |     |     |     |     |     |     |     |     | 870  |     |     |     |     |     |     |     |     |     | 875  |     |     |     |     |     |     |     |     |     |     |     |
| Ile  | Val | Tyr | Val | Ala | Asp | Gln | Leu | Asp | Arg | Glu  | Ser | Lys | Ala | Asn | Tyr | Ile | Val | Tyr | Val | Ala  | Asp | Gln | Leu | Asp | Arg | Glu | Ser | Lys | Ala | Asn | Tyr |
| 885  |     |     |     |     |     |     |     |     |     | 890  |     |     |     |     |     |     |     |     |     | 895  |     |     |     |     |     |     |     |     |     |     |     |
| Ser  | Leu | Lys | Ile | Glu | Ala | Arg | Asp | Lys | Ala | Glu  | Ser | Gly | Gln | Gln | Leu | Ser | Leu | Lys | Ile | Glu  | Ala | Arg | Asp | Lys | Ala | Glu | Ser | Gly | Gln | Gln | Leu |
| 900  |     |     |     |     |     |     |     |     |     | 905  |     |     |     |     |     |     |     |     |     | 910  |     |     |     |     |     |     |     |     |     |     |     |
| Phe  | Ser | Val | Thr | Leu | Lys | Val | Phe | Leu | Asp | Asp  | Val | Asn | Asp | Cys | Phe | Ser | Val | Thr | Leu | Lys  | Val | Phe | Leu | Asp | Asp | Val | Asn | Asp | Cys |     |     |
| 915  |     |     |     |     |     |     |     |     |     | 920  |     |     |     |     |     |     |     |     |     | 925  |     |     |     |     |     |     |     |     |     |     |     |
| Ser  | Pro | Ala | Phe | Ile | Pro | Ser | Ser | Tyr | Ser | Val  | Lys | Val | Leu | Glu | Asp | Ser | Pro | Ala | Phe | Ile  | Pro | Ser | Ser | Tyr | Ser | Val | Lys | Val | Leu | Glu | Asp |
| 930  |     |     |     |     |     |     |     |     |     | 935  |     |     |     |     |     |     |     |     |     | 940  |     |     |     |     |     |     |     |     |     |     |     |
| Leu  | Pro | Val | Gly | Thr | Val | Ile | Ala | Trp | Leu | Glu  | Thr | His | Asp | Pro | Asp | Leu | Pro | Val | Gly | Thr  | Val | Ile | Ala | Trp | Leu | Glu | Thr | His | Asp | Pro | Asp |
| 945  |     |     |     |     |     |     |     |     |     | 950  |     |     |     |     |     |     |     |     |     | 955  |     |     |     |     |     |     |     |     |     |     |     |
| Leu  | Gly | Leu | Gly | Gly | Gln | Val | Arg | Tyr | Ser | Leu  | Val | Asn | Asp | Tyr | Asn | Leu | Gly | Leu | Gly | Gly  | Gln | Val | Arg | Tyr | Ser | Leu | Val | Asn | Asp | Tyr | Asn |
| 965  |     |     |     |     |     |     |     |     |     | 970  |     |     |     |     |     |     |     |     |     | 975  |     |     |     |     |     |     |     |     |     |     |     |
| Gly  | Arg | Phe | Glu | Ile | Asp | Lys | Ala | Ser | Gly | Ala  | Ile | Arg | Leu | Ser | Lys | Gly | Arg | Phe | Glu | Ile  | Asp | Lys | Ala | Ser | Gly | Ala | Ile | Arg | Leu | Ser | Lys |
| 980  |     |     |     |     |     |     |     |     |     | 985  |     |     |     |     |     |     |     |     |     | 990  |     |     |     |     |     |     |     |     |     |     |     |
| Glu  | Leu | Asp | Tyr | Glu | Lys | Gln | Gln | Phe | Tyr | Asn  | Leu | Thr | Val | Arg | Ala | Glu | Leu | Asp | Tyr | Glu  | Lys | Gln | Gln | Phe | Tyr | Asn | Leu | Thr | Val | Arg | Ala |
| 995  |     |     |     |     |     |     |     |     |     | 1000 |     |     |     |     |     |     |     |     |     | 1005 |     |     |     |     |     |     |     |     |     |     |     |
| Lys  | Asp | Lys | Gly | Arg | Pro | Val | Ser | Leu | Ser | Ser  | Val | Ser | Phe | Val | Glu | Lys | Asp | Lys | Gly | Arg  | Pro | Val | Ser | Leu | Ser | Ser | Val | Ser | Phe | Val | Glu |
| 1010 |     |     |     |     |     |     |     |     |     | 1015 |     |     |     |     |     |     |     |     |     | 1020 |     |     |     |     |     |     |     |     |     |     |     |
| Val  | Glu | Val | Val | Asp | Val | Asn | Glu | Asn | Leu | His  | Thr | Pro | Tyr | Phe | Pro | Val | Glu | Val | Val | Asp  | Val | Asn | Glu | Asn | Leu | His | Thr | Pro | Tyr | Phe | Pro |

|                 |                     |                     |                 |      |  |      |
|-----------------|---------------------|---------------------|-----------------|------|--|------|
| 1025            |                     | 1030                |                 | 1035 |  | 1040 |
| Asp Phe Ala Val | Val Gly Ser Val Lys | Glu Asn Ser Arg Ile | Gly Thr         |      |  |      |
|                 | 1045                | 1050                | 1055            |      |  |      |
| Ser Val Leu Gln | Val Thr Ala Arg Asp | Glu Asp Ser Gly Arg | Asp Gly         |      |  |      |
|                 | 1060                | 1065                | 1070            |      |  |      |
| Glu Ile Gln Tyr | Ser Ile Arg Asp     | Gly Ser Gly Leu     | Gly Arg Phe Ser |      |  |      |
|                 | 1075                | 1080                | 1085            |      |  |      |
| Ile Asp Asp Glu | Ser Gly Val Ile Thr | Ala Ala Asp         | Ile Leu Asp Arg |      |  |      |
|                 | 1090                | 1095                | 1100            |      |  |      |
| Glu Thr Met Gly | Ser Tyr Trp Leu Thr | Val Tyr Ala Thr     | Asp Arg Gly     |      |  |      |
| 1105            | 1110                | 1115                | 1120            |      |  |      |
| Val Val Pro Leu | Tyr Ser Thr Ile Glu | Val Tyr Ile Glu     | Val Glu Asp     |      |  |      |
|                 | 1125                | 1130                | 1135            |      |  |      |
| Val Asn Asp Asn | Ala Pro Leu Thr Ser | Glu Pro Ile Tyr     | Tyr Pro Val     |      |  |      |
|                 | 1140                | 1145                | 1150            |      |  |      |
| Val Met Glu Asn | Ser Pro Lys Asp     | Val Ser Val Ile     | Gln Ile Gln Ala |      |  |      |
|                 | 1155                | 1160                | 1165            |      |  |      |
| Glu Asp Pro Asp | Ser Ser Ser Asn     | Glu Lys Leu Thr     | Tyr Arg Ile Thr |      |  |      |
|                 | 1170                | 1175                | 1180            |      |  |      |
| Ser Gly Asn Pro | Gln Asn Phe Phe     | Ala Ile Asn Ile     | Lys Thr Gly Leu |      |  |      |
| 1185            | 1190                | 1195                | 1200            |      |  |      |
| Ile Thr Thr Thr | Ser Arg Lys Leu Asp | Arg Glu Gln Gln     | Ala Glu His     |      |  |      |
|                 | 1205                | 1210                | 1215            |      |  |      |
| Phe Leu Glu Val | Thr Val Thr Asp     | Gly Gly Pro Ser     | Pro Lys Gln Ser |      |  |      |
|                 | 1220                | 1225                | 1230            |      |  |      |
| Thr Ile Trp Val | Val Val Gln Val     | Leu Asp Glu Asn     | Asp Asn Lys Pro |      |  |      |
|                 | 1235                | 1240                | 1245            |      |  |      |
| Gln Phe Pro Glu | Lys Val Tyr Gln     | Ile Lys Leu Pro     | Glu Arg Asp Arg |      |  |      |
|                 | 1250                | 1255                | 1260            |      |  |      |
| Lys Lys Arg Gly | Glu Pro Ile Tyr     | Arg Ala Phe Ala     | Phe Asp Arg Asp |      |  |      |
| 1265            | 1270                | 1275                | 1280            |      |  |      |
| Glu Gly Pro Asn | Ala Glu Ile Ser     | Tyr Ser Ile Val     | Asp Gly Asn Asp |      |  |      |
|                 | 1285                | 1290                | 1295            |      |  |      |
| Asp Gly Lys Phe | Phe Ile Asp Pro     | Lys Thr Gly Met     | Val Ser Ser Arg |      |  |      |
|                 | 1300                | 1305                | 1310            |      |  |      |
| Lys Gln Phe Thr | Ala Gly Ser Tyr     | Asp Ile Leu Thr     | Ile Lys Ala Val |      |  |      |
|                 | 1315                | 1320                | 1325            |      |  |      |
| Asp Asn Gly Arg | Pro Gln Lys Ser     | Ser Thr Ala Arg     | Leu His Ile Glu |      |  |      |
|                 | 1330                | 1335                | 1340            |      |  |      |
| Trp Ile Lys Lys | Pro Pro Ser Pro     | Ile Pro Leu Thr     | Phe Asp Glu     |      |  |      |
| 1345            | 1350                | 1355                | 1360            |      |  |      |
| Pro Phe Tyr Asn | Phe Thr Val Met     | Glu Ser Asp Arg     | Val Thr Glu Ile |      |  |      |
|                 | 1365                | 1370                | 1375            |      |  |      |
| Val Gly Val Val | Ser Val Gln Pro     | Ala Asn Thr Pro     | Leu Trp Phe Asp |      |  |      |
|                 | 1380                | 1385                | 1390            |      |  |      |
| Ile Val Gly Gly | Asn Phe Asp Ser     | Ala Phe Asp Ala     | Glu Lys Gly Val |      |  |      |
|                 | 1395                | 1400                | 1405            |      |  |      |
| Gly Thr Ile Val | Ile Ala Lys Pro     | Leu Asp Ala Glu     | Gln Arg Ser Ile |      |  |      |
|                 | 1410                | 1415                | 1420            |      |  |      |
| Tyr Asn Met Ser | Val Glu Val Thr     | Asp Gly Thr Asn     | Val Ala Val Thr |      |  |      |
| 1425            | 1430                | 1435                | 1440            |      |  |      |
| Gln Val Phe Ile | Lys Val Leu Asp     | Asn Asn Asp Asn     | Gly Pro Glu Phe |      |  |      |
|                 | 1445                | 1450                | 1455            |      |  |      |
| Ser Gln Pro Asn | Tyr Asp Val Thr     | Ile Ser Glu Asp     | Val Leu Pro Asp |      |  |      |
|                 | 1460                | 1465                | 1470            |      |  |      |
| Thr Glu Ile Leu | Gln Ile Glu Ala     | Thr Asp Arg Asp     | Glu Lys His Lys |      |  |      |

| 1475 |     |     |     |     | 1480 |      |     |     |     | 1485 |      |     |     |     |      |
|------|-----|-----|-----|-----|------|------|-----|-----|-----|------|------|-----|-----|-----|------|
| Leu  | Ser | Tyr | Thr | Val | His  | Ser  | Ser | Ile | Asp | Ser  | Ile  | Ser | Met | Arg | Lys  |
| 1490 |     |     |     |     |      | 1495 |     |     |     |      | 1500 |     |     |     |      |
| Phe  | Arg | Ile | Asp | Pro | Ser  | Thr  | Gly | Val | Leu | Tyr  | Thr  | Ala | Glu | Arg | Leu  |
| 1505 |     |     |     |     | 1510 |      |     |     |     | 1515 |      |     |     |     | 1520 |
| Asp  | His | Glu | Ala | Gln | Asp  | Lys  | His | Ile | Leu | Asn  | Ile  | Met | Val | Arg | Asp  |
|      |     |     |     |     | 1525 |      |     |     |     | 1530 |      |     |     |     | 1535 |
| Gln  | Glu | Phe | Pro | Tyr | Arg  | Arg  | Asn | Leu | Ala | Arg  | Val  | Ile | Val | Asn | Val  |
|      |     |     |     |     | 1540 |      |     |     |     | 1545 |      |     |     |     | 1550 |
| Glu  | Asp | Ala | Asn | Asp | His  | Ser  | Pro | Tyr | Phe | Thr  | Asn  | Pro | Leu | Tyr | Glu  |
|      |     |     |     |     | 1555 |      |     |     |     | 1560 |      |     |     |     | 1565 |
| Ala  | Ser | Val | Phe | Glu | Ser  | Ala  | Ala | Leu | Gly | Ser  | Ala  | Val | Leu | Gln | Val  |
|      |     |     |     |     | 1570 |      |     |     |     | 1575 |      |     |     |     | 1580 |
| Thr  | Ala | Leu | Asp | Lys | Asp  | Lys  | Gly | Glu | Asn | Ala  | Glu  | Leu | Ile | Tyr | Thr  |
| 1585 |     |     |     |     | 1590 |      |     |     |     | 1595 |      |     |     |     | 1600 |
| Ile  | Glu | Ala | Gly | Asn | Thr  | Gly  | Asn | Met | Phe | Lys  | Ile  | Glu | Pro | Val | Leu  |
|      |     |     |     |     | 1605 |      |     |     |     | 1610 |      |     |     |     | 1615 |
| Gly  | Ile | Ile | Thr | Ile | Cys  | Lys  | Glu | Pro | Asp | Met  | Thr  | Thr | Met | Gly | Gln  |
|      |     |     |     |     | 1620 |      |     |     |     | 1625 |      |     |     |     | 1630 |
| Phe  | Val | Leu | Ser | Ile | Lys  | Val  | Thr | Asp | Gln | Gly  | Ser  | Pro | Pro | Met | Ser  |
|      |     |     |     |     | 1635 |      |     |     |     | 1640 |      |     |     |     | 1645 |
| Ala  | Thr | Ala | Ile | Val | Arg  | Ile  | Ser | Val | Thr | Met  | Ser  | Asp | Asn | Ser | His  |
|      |     |     |     |     | 1650 |      |     |     |     | 1655 |      |     |     |     | 1660 |
| Pro  | Lys | Phe | Ile | His | Lys  | Asp  | Tyr | Gln | Ala | Glu  | Val  | Asn | Glu | Asn | Val  |
| 1665 |     |     |     |     | 1670 |      |     |     |     | 1675 |      |     |     |     | 1680 |
| Asp  | Ile | Gly | Thr | Ser | Val  | Ile  | Leu | Ile | Ser | Ala  | Ile  | Ser | Gln | Ser | Thr  |
|      |     |     |     |     | 1685 |      |     |     |     | 1690 |      |     |     |     | 1695 |
| Leu  | Ile | Tyr | Glu | Val | Lys  | Asp  | Gly | Asp | Ile | Asn  | Gly  | Ile | Phe | Thr | Ile  |
|      |     |     |     |     | 1700 |      |     |     |     | 1705 |      |     |     |     | 1710 |
| Asn  | Pro | Tyr | Ser | Gly | Val  | Ile  | Thr | Thr | Gln | Lys  | Ala  | Leu | Asp | Tyr | Glu  |
|      |     |     |     |     | 1715 |      |     |     |     | 1720 |      |     |     |     | 1725 |
| Arg  | Thr | Ser | Ser | Tyr | Gln  | Leu  | Ile | Ile | Gln | Ala  | Thr  | Asn | Met | Ala | Gly  |
|      |     |     |     |     | 1730 |      |     |     |     | 1735 |      |     |     |     | 1740 |
| Met  | Ala | Ser | Asn | Ala | Thr  | Val  | Asn | Ile | Gln | Ile  | Val  | Asp | Glu | Asn | Asp  |
| 1745 |     |     |     |     | 1750 |      |     |     |     | 1755 |      |     |     |     | 1760 |
| Asn  | Ala | Pro | Val | Phe | Leu  | Phe  | Ser | Gln | Tyr | Ser  | Gly  | Ser | Leu | Ser | Glu  |
|      |     |     |     |     | 1765 |      |     |     |     | 1770 |      |     |     |     | 1775 |
| Ala  | Ala | Pro | Ile | Asn | Ser  | Ile  | Val | Arg | Ser | Leu  | Asp  | Asn | Ser | Pro | Leu  |
|      |     |     |     |     | 1780 |      |     |     |     | 1785 |      |     |     |     | 1790 |
| Val  | Ile | Arg | Ala | Thr | Asp  | Ala  | Asp | Ser | Asn | Arg  | Asn  | Ala | Leu | Leu | Val  |
|      |     |     |     |     | 1795 |      |     |     |     | 1800 |      |     |     |     | 1805 |
| Tyr  | Gln | Ile | Val | Glu | Ser  | Thr  | Ala | Lys | Lys | Phe  | Phe  | Thr | Val | Asp | Ser  |
|      |     |     |     |     | 1810 |      |     |     |     | 1815 |      |     |     |     | 1820 |
| Ser  | Thr | Gly | Ala | Ile | Arg  | Thr  | Ile | Ala | Asn | Leu  | Asp  | His | Glu | Thr | Ile  |
| 1825 |     |     |     |     | 1830 |      |     |     |     | 1835 |      |     |     |     | 1840 |
| Ala  | His | Phe | His | Phe | His  | Val  | His | Val | Arg | Asp  | Ser  | Gly | Ser | Pro | Gln  |
|      |     |     |     |     | 1845 |      |     |     |     | 1850 |      |     |     |     | 1855 |
| Leu  | Thr | Ala | Glu | Ser | Pro  | Val  | Glu | Val | Asn | Ile  | Glu  | Val | Thr | Asp | Val  |
|      |     |     |     |     | 1860 |      |     |     |     | 1865 |      |     |     |     | 1870 |
| Asn  | Asp | Asn | Pro | Pro | Val  | Phe  | Thr | Gln | Ala | Val  | Phe  | Glu | Thr | Ile | Leu  |
|      |     |     |     |     | 1875 |      |     |     |     | 1880 |      |     |     |     | 1885 |
| Leu  | Leu | Pro | Thr | Tyr | Val  | Gly  | Val | Glu | Val | Leu  | Lys  | Val | Ser | Ala | Thr  |
|      |     |     |     |     | 1890 |      |     |     |     | 1895 |      |     |     |     | 1900 |
| Asp  | Pro | Asp | Ser | Glu | Val  | Pro  | Pro | Glu | Leu | Thr  | Tyr  | Ser | Leu | Met | Glu  |
| 1905 |     |     |     |     | 1910 |      |     |     |     | 1915 |      |     |     |     | 1920 |
| Gly  | Ser | Leu | Asp | His | Phe  | Leu  | Ile | Asp | Ser | Asn  | Ser  | Gly | Val | Leu | Thr  |

| 1925 |     |     |     |     | 1930 |     |     |     |     | 1935 |     |     |     |     |     |
|------|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|-----|-----|
| Ile  | Lys | Asn | Asn | Asn | Leu  | Ser | Lys | Asp | His | Tyr  | Met | Leu | Ile | Val | Lys |
| 1940 |     |     |     |     | 1945 |     |     |     |     | 1950 |     |     |     |     |     |
| Val  | Ser | Asp | Gly | Lys | Phe  | Tyr | Ser | Thr | Ser | Met  | Val | Thr | Ile | Met | Val |
| 1955 |     |     |     |     | 1960 |     |     |     |     | 1965 |     |     |     |     |     |
| Lys  | Glu | Ala | Met | Asp | Ser  | Gly | Leu | His | Phe | Thr  | Gln | Ser | Phe | Tyr | Ser |
| 1970 |     |     |     |     | 1975 |     |     |     |     | 1980 |     |     |     |     |     |
| Thr  | Ser | Ile | Ser | Glu | Asn  | Asn | Thr | Asn | Ile | Thr  | Lys | Val | Ala | Ile | Val |
| 1985 |     |     |     |     | 1990 |     |     |     |     | 1995 |     |     |     |     |     |
| Asn  | Ala | Val | Gly | Asn | Arg  | Leu | Asn | Glu | Pro | Leu  | Lys | Tyr | Ser | Ile | Leu |
| 2005 |     |     |     |     | 2010 |     |     |     |     | 2015 |     |     |     |     |     |
| Asn  | Pro | Gly | Asn | Lys | Phe  | Lys | Ile | Lys | Ser | Thr  | Ser | Gly | Val | Ile | Gln |
| 2020 |     |     |     |     | 2025 |     |     |     |     | 2030 |     |     |     |     |     |
| Thr  | Thr | Gly | Val | Pro | Phe  | Asp | Arg | Glu | Glu | Gln  | Glu | Leu | Tyr | Glu | Leu |
| 2035 |     |     |     |     | 2040 |     |     |     |     | 2045 |     |     |     |     |     |
| Val  | Val | Glu | Ala | Ser | Arg  | Glu | Leu | Asp | His | Leu  | Arg | Val | Ala | Arg | Val |
| 2050 |     |     |     |     | 2055 |     |     |     |     | 2060 |     |     |     |     |     |
| Val  | Val | Arg | Val | Asn | Ile  | Glu | Asp | Ile | Asn | Asp  | Asn | Ser | Pro | Val | Phe |
| 2065 |     |     |     |     | 2070 |     |     |     |     | 2075 |     |     |     |     |     |
| Val  | Gly | Leu | Pro | Tyr | Tyr  | Ala | Ala | Val | Gln | Val  | Asp | Ala | Glu | Pro | Gly |
| 2085 |     |     |     |     | 2090 |     |     |     |     | 2095 |     |     |     |     |     |
| Thr  | Leu | Ile | Tyr | Gln | Val  | Thr | Ala | Ile | Asp | Lys  | Asp | Lys | Gly | Pro | Asn |
| 2100 |     |     |     |     | 2105 |     |     |     |     | 2110 |     |     |     |     |     |
| Gly  | Glu | Val | Thr | Tyr | Val  | Leu | Gln | Asp | Asp | Tyr  | Gly | His | Phe | Glu | Ile |
| 2115 |     |     |     |     | 2120 |     |     |     |     | 2125 |     |     |     |     |     |
| Asn  | Pro | Asn | Ser | Gly | Asn  | Val | Ile | Leu | Lys | Glu  | Ala | Phe | Asn | Ser | Asp |
| 2130 |     |     |     |     | 2135 |     |     |     |     | 2140 |     |     |     |     |     |
| Leu  | Ser | Asn | Ile | Glu | Tyr  | Gly | Val | Thr | Ile | Leu  | Ala | Lys | Asp | Gly | Gly |
| 2145 |     |     |     |     | 2150 |     |     |     |     | 2155 |     |     |     |     |     |
| Lys  | Pro | Ser | Leu | Ser | Thr  | Ser | Val | Glu | Leu | Pro  | Ile | Thr | Ile | Val | Asn |
| 2165 |     |     |     |     | 2170 |     |     |     |     | 2175 |     |     |     |     |     |
| Lys  | Ala | Met | Pro | Val | Phe  | Asp | Lys | Pro | Phe | Tyr  | Thr | Ala | Ser | Val | Asn |
| 2180 |     |     |     |     | 2185 |     |     |     |     | 2190 |     |     |     |     |     |
| Glu  | Asp | Ile | Arg | Met | Asn  | Thr | Pro | Ile | Leu | Ser  | Ile | Asn | Ala | Thr | Ser |
| 2195 |     |     |     |     | 2200 |     |     |     |     | 2205 |     |     |     |     |     |
| Pro  | Glu | Gly | Gln | Gly | Ile  | Ile | Tyr | Ile | Ile | Ile  | Asp | Gly | Asp | Pro | Phe |
| 2210 |     |     |     |     | 2215 |     |     |     |     | 2220 |     |     |     |     |     |
| Lys  | Gln | Phe | Asn | Ile | Asp  | Phe | Asp | Thr | Gly | Val  | Leu | Lys | Val | Val | Ser |
| 2225 |     |     |     |     | 2230 |     |     |     |     | 2235 |     |     |     |     |     |
| Pro  | Leu | Asp | Tyr | Glu | Val  | Thr | Ser | Ala | Tyr | Lys  | Leu | Thr | Ile | Arg | Ala |
| 2245 |     |     |     |     | 2250 |     |     |     |     | 2255 |     |     |     |     |     |
| Ser  | Asp | Ala | Leu | Thr | Gly  | Ala | Arg | Ala | Glu | Val  | Thr | Val | Asp | Leu | Leu |
| 2260 |     |     |     |     | 2265 |     |     |     |     | 2270 |     |     |     |     |     |
| Val  | Asn | Asp | Val | Asn | Asp  | Asn | Pro | Pro | Ile | Phe  | Asp | Gln | Pro | Thr | Tyr |
| 2275 |     |     |     |     | 2280 |     |     |     |     | 2285 |     |     |     |     |     |
| Asn  | Thr | Thr | Leu | Ser | Glu  | Ala | Ser | Leu | Ile | Gly  | Thr | Pro | Val | Leu | Gln |
| 2290 |     |     |     |     | 2295 |     |     |     |     | 2300 |     |     |     |     |     |
| Val  | Val | Ser | Ile | Asp | Ala  | Asp | Ser | Glu | Asn | Asn  | Lys | Met | Val | His | Tyr |
| 2305 |     |     |     |     | 2310 |     |     |     |     | 2315 |     |     |     |     |     |
| Gln  | Ile | Val | Gln | Asp | Thr  | Tyr | Asn | Ser | Thr | Asp  | Tyr | Phe | His | Ile | Asp |
| 2325 |     |     |     |     | 2330 |     |     |     |     | 2335 |     |     |     |     |     |
| Ser  | Ser | Ser | Gly | Leu | Ile  | Leu | Thr | Ala | Arg | Met  | Leu | Asp | His | Glu | Leu |
| 2340 |     |     |     |     | 2345 |     |     |     |     | 2350 |     |     |     |     |     |
| Val  | Gln | His | Cys | Thr | Leu  | Lys | Val | Arg | Ser | Ile  | Asp | Ser | Gly | Phe | Pro |
| 2355 |     |     |     |     | 2360 |     |     |     |     | 2365 |     |     |     |     |     |
| Ser  | Leu | Ser | Ser | Glu | Val  | Leu | Val | His | Ile | Tyr  | Ile | Ser | Asp | Val | Asn |

|   |      |      |
|---|------|------|
| 2370  | 2375 | 2380 |
| Asp Asn Pro Pro Val Phe Asn Gln Leu Ile Tyr Glu Ser Tyr Val Ser |      |      |
| 2385  | 2390 | 2395 |
| Glu Leu Ala Pro Arg Gly His Phe Val Thr Cys Val Gln Ala Ser Asp |      | 2400 |
|   | 2405 | 2410 |
| Ala Asp Ser Ser Asp Phe Asp Arg Leu Glu Tyr Ser Ile Leu Ser Gly |      | 2415 |
|   | 2420 | 2425 |
| Asn Asp Arg Thr Ser Phe Leu Met Asp Ser Lys Ser Gly Val Ile Thr |      | 2430 |
|   | 2435 | 2440 |
| Leu Ser Asn His Arg Lys Gln Arg Met Glu Pro Leu Tyr Ser Leu Asn |      | 2445 |
|   | 2450 | 2455 |
| Val Ser Val Ser Asp Gly Leu Phe Thr Ser Thr Ala Gln Val His Ile |      | 2460 |
| 2465  | 2470 | 2475 |
| Arg Val Leu Gly Ala Asn Leu Tyr Ser Pro Ala Phe Ser Gln Ser Thr |      | 2480 |
|   | 2485 | 2490 |
| Tyr Val Ala Glu Val Arg Glu Asn Val Ala Ala Gly Thr Lys Val Ile |      | 2495 |
|   | 2500 | 2505 |
| His Val Arg Ala Thr Asp Gly Asp Pro Gly Thr Tyr Gly Gln Ile Ser |      | 2510 |
|   | 2515 | 2520 |
| Tyr Ala Ile Ile Asn Asp Phe Ala Lys Asp Arg Phe Leu Ile Asp Ser |      | 2525 |
|   | 2530 | 2535 |
| Asn Gly Gln Val Ile Thr Thr Glu Arg Leu Asp Arg Glu Asn Pro Leu |      | 2540 |
| 2545  | 2550 | 2555 |
| Glu Gly Asp Val Ser Ile Phe Val Arg Ala Leu Asp Gly Gly Gly Arg |      | 2560 |
|   | 2565 | 2570 |
| Thr Thr Phe Cys Thr Val Arg Val Ile Val Val Asp Glu Asn Asp Asn |      | 2575 |
|   | 2580 | 2585 |
| Ala Pro Gln Phe Met Thr Val Glu Tyr Arg Ala Ser Val Arg Ala Asp |      | 2590 |
|   | 2595 | 2600 |
| Val Gly Arg Gly His Leu Val Thr Gln Val Gln Ala Ile Asp Pro Asp |      | 2605 |
|   | 2610 | 2615 |
| Asp Gly Ala Asn Ser Arg Ile Thr Tyr Ser Leu Tyr Ser Glu Ala Ser |      | 2620 |
| 2625  | 2630 | 2635 |
| Val Ser Val Ala Asp Leu Leu Glu Ile Asp Pro Asp Asn Gly Trp Met |      | 2640 |
|   | 2645 | 2650 |
| Val Thr Lys Gly Asn Phe Asn Gln Leu Lys Asn Thr Val Leu Ser Phe |      | 2655 |
|   | 2660 | 2665 |
| Phe Val Lys Ala Val Asp Gly Gly Ile Pro Val Lys His Ser Leu Ile |      | 2670 |
|   | 2675 | 2680 |
| Pro Val Tyr Ile His Val Leu Pro Pro Glu Thr Phe Leu Pro Ser Phe |      | 2685 |
|   | 2690 | 2695 |
| Thr Gln Ser Gln Tyr Ser Phe Thr Ile Ala Glu Asp Thr Ala Ile Gly |      | 2700 |
| 2705  | 2710 | 2715 |
| Ser Thr Val Asp Thr Leu Arg Ile Leu Pro Ser Gln Asn Val Trp Phe |      | 2720 |
|   | 2725 | 2730 |
| Ser Thr Val Asn Gly Glu Arg Pro Glu Asn Asn Lys Gly Gly Val Phe |      | 2735 |
|   | 2740 | 2745 |
| Val Ile Glu Gln Glu Thr Gly Thr Ile Lys Leu Asp Lys Arg Leu Asp |      | 2750 |
|   | 2755 | 2760 |
| Arg Glu Thr Ser Pro Ala Phe His Phe Lys Val Ala Ala Thr Ile Pro |      | 2765 |
|   | 2770 | 2775 |
| Leu Asp Lys Val Asp Ile Val Phe Thr Val Asp Val Asp Ile Lys Val |      | 2780 |
| 2785  | 2790 | 2795 |
| Leu Asp Leu Asn Asp Asn Lys Pro Val Phe Glu Thr Ser Ser Tyr Asp |      | 2800 |
|   | 2805 | 2810 |
| Thr Ile Ile Met Glu Gly Met Pro Val Gly Thr Lys Leu Thr Gln Val |      | 2815 |

| 2820 |     |     |     |     | 2825 |     |     |     |     | 2830 |     |     |     |     |     |
|------|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|-----|-----|
| Arg  | Ala | Ile | Asp | Met | Asp  | Trp | Gly | Ala | Asn | Gly  | Gln | Val | Thr | Tyr | Ser |
| 2835 |     |     |     |     | 2840 |     |     |     |     | 2845 |     |     |     |     |     |
| Leu  | His | Ser | Asp | Ser | Gln  | Pro | Glu | Lys | Val | Met  | Glu | Ala | Phe | Asn | Ile |
| 2850 |     |     |     |     | 2855 |     |     |     |     | 2860 |     |     |     |     |     |
| Asp  | Ser | Asn | Thr | Gly | Trp  | Ile | Ser | Thr | Leu | Lys  | Asp | Leu | Asp | His | Glu |
| 2865 |     |     |     |     | 2870 |     |     |     |     | 2875 |     |     |     |     |     |
| Thr  | Asp | Pro | Thr | Phe | Thr  | Phe | Ser | Val | Val | Ala  | Ser | Asp | Leu | Gly | Glu |
| 2885 |     |     |     |     | 2890 |     |     |     |     | 2895 |     |     |     |     |     |
| Ala  | Phe | Ser | Leu | Ser | Ser  | Thr | Ala | Leu | Val | Ser  | Val | Arg | Val | Thr | Asp |
| 2900 |     |     |     |     | 2905 |     |     |     |     | 2910 |     |     |     |     |     |
| Ile  | Asn | Asp | Asn | Ala | Pro  | Val | Phe | Ala | Gln | Glu  | Val | Tyr | Arg | Gly | Asn |
| 2915 |     |     |     |     | 2920 |     |     |     |     | 2925 |     |     |     |     |     |
| Val  | Lys | Glu | Ser | Asp | Pro  | Pro | Gly | Glu | Val | Val  | Ala | Val | Leu | Ser | Thr |
| 2930 |     |     |     |     | 2935 |     |     |     |     | 2940 |     |     |     |     |     |
| Trp  | Asp | Arg | Asp | Thr | Ser  | Asp | Val | Asn | Arg | Gln  | Val | Ser | Tyr | His | Ile |
| 2945 |     |     |     |     | 2950 |     |     |     |     | 2955 |     |     |     |     |     |
| Thr  | Gly | Gly | Asn | Pro | Arg  | Gly | Arg | Phe | Ala | Leu  | Gly | Leu | Val | Gln | Ser |
| 2965 |     |     |     |     | 2970 |     |     |     |     | 2975 |     |     |     |     |     |
| Glu  | Trp | Lys | Val | Tyr | Val  | Lys | Arg | Pro | Leu | Asp  | Arg | Glu | Glu | Gln | Asp |
| 2980 |     |     |     |     | 2985 |     |     |     |     | 2990 |     |     |     |     |     |
| Ile  | Tyr | Phe | Leu | Asn | Ile  | Thr | Ala | Thr | Asp | Gly  | Leu | Phe | Val | Thr | Gln |
| 2995 |     |     |     |     | 3000 |     |     |     |     | 3005 |     |     |     |     |     |
| Ala  | Met | Val | Glu | Val | Ser  | Val | Ser | Asp | Val | Asn  | Asp | Asn | Ser | Pro | Val |
| 3010 |     |     |     |     | 3015 |     |     |     |     | 3020 |     |     |     |     |     |
| Cys  | Asp | Gln | Val | Ala | Tyr  | Thr | Ala | Leu | Leu | Pro  | Glu | Asp | Ile | Pro | Ser |
| 3025 |     |     |     |     | 3030 |     |     |     |     | 3035 |     |     |     |     |     |
| Asn  | Lys | Ile | Ile | Leu | Lys  | Val | Ser | Ala | Lys | Asp  | Ala | Asp | Ile | Gly | Ser |
| 3045 |     |     |     |     | 3050 |     |     |     |     | 3055 |     |     |     |     |     |
| Asn  | Gly | Tyr | Ile | Arg | Tyr  | Ser | Leu | Tyr | Gly | Ser  | Gly | Asn | Ser | Glu | Phe |
| 3060 |     |     |     |     | 3065 |     |     |     |     | 3070 |     |     |     |     |     |
| Phe  | Leu | Asp | Pro | Glu | Ser  | Gly | Glu | Leu | Lys | Thr  | Leu | Ala | Leu | Leu | Asp |
| 3075 |     |     |     |     | 3080 |     |     |     |     | 3085 |     |     |     |     |     |
| Arg  | Glu | Arg | Ile | Pro | Val  | Tyr | Ser | Leu | Met | Ala  | Lys | Ala | Thr | Asp | Gly |
| 3090 |     |     |     |     | 3095 |     |     |     |     | 3100 |     |     |     |     |     |
| Gly  | Gly | Arg | Phe | Cys | Gln  | Ser | Asn | Ile | His | Leu  | Ile | Leu | Glu | Asp | Val |
| 3105 |     |     |     |     | 3110 |     |     |     |     | 3115 |     |     |     |     |     |
| Asn  | Asp | Asn | Pro | Pro | Val  | Phe | Ser | Ser | Asp | His  | Tyr | Asn | Thr | Cys | Val |
| 3125 |     |     |     |     | 3130 |     |     |     |     | 3135 |     |     |     |     |     |
| Tyr  | Glu | Asn | Thr | Ala | Thr  | Lys | Ala | Leu | Leu | Thr  | Arg | Val | Gln | Ala | Val |
| 3140 |     |     |     |     | 3145 |     |     |     |     | 3150 |     |     |     |     |     |
| Asp  | Pro | Asp | Ile | Gly | Ile  | Asn | Arg | Lys | Val | Val  | Tyr | Ser | Leu | Ala | Asp |
| 3155 |     |     |     |     | 3160 |     |     |     |     | 3165 |     |     |     |     |     |
| Ser  | Ala | Gly | Gly | Val | Phe  | Ser | Ile | Asp | Ser | Ser  | Ser | Ser | Gly | Ile | Ile |
| 3170 |     |     |     |     | 3175 |     |     |     |     | 3180 |     |     |     |     |     |
| Leu  | Glu | Gln | Pro | Leu | Asp  | Arg | Glu | Gln | Gln | Ser  | Ser | Tyr | Asn | Ile | Ser |
| 3185 |     |     |     |     | 3190 |     |     |     |     | 3195 |     |     |     |     |     |
| Val  | Arg | Ala | Thr | Asp | Gln  | Ser | Pro | Gly | Gln | Ser  | Leu | Ser | Ser | Leu | Thr |
| 3205 |     |     |     |     | 3210 |     |     |     |     | 3215 |     |     |     |     |     |
| Thr  | Val | Thr | Ile | Thr | Val  | Leu | Asp | Ile | Asn | Asp  | Asn | Pro | Pro | Val | Phe |
| 3220 |     |     |     |     | 3225 |     |     |     |     | 3230 |     |     |     |     |     |
| Glu  | Arg | Arg | Asp | Tyr | Leu  | Val | Thr | Val | Pro | Glu  | Asp | Thr | Ser | Pro | Gly |
| 3235 |     |     |     |     | 3240 |     |     |     |     | 3245 |     |     |     |     |     |
| Thr  | Gln | Val | Leu | Ala | Val  | Phe | Ala | Thr | Ser | Lys  | Asp | Ile | Gly | Thr | Asn |
| 3250 |     |     |     |     | 3255 |     |     |     |     | 3260 |     |     |     |     |     |
| Ala  | Glu | Ile | Thr | Tyr | Leu  | Ile | Arg | Ser | Gly | Asn  | Glu | Gln | Gly | Lys | Phe |

|                 |                     |                     |                 |      |  |      |
|-----------------|---------------------|---------------------|-----------------|------|--|------|
| 3265            |                     | 3270                |                 | 3275 |  | 3280 |
| Lys Ile Asn Pro | Lys Thr Gly Gly Ile | Ser Val Ser Glu Val | Leu Asp         |      |  |      |
|                 | 3285                |                     | 3290            |      |  | 3295 |
| Tyr Glu Leu Cys | Lys Arg Phe Tyr     | Leu Val Val Glu Ala | Lys Asp Gly     |      |  |      |
|                 | 3300                |                     | 3305            |      |  | 3310 |
| Gly Thr Pro Ala | Leu Ser Ala Val     | Ala Thr Val Asn Ile | Asn Leu Thr     |      |  |      |
|                 | 3315                |                     | 3320            |      |  | 3325 |
| Asp Val Asn Asp | Asn Pro Pro Lys Phe | Ser Gln Asp Val     | Tyr Ser Ala     |      |  |      |
|                 | 3330                |                     | 3335            |      |  | 3340 |
| Val Ile Ser Glu | Asp Ala Leu Val     | Gly Asp Ser Val     | Ile Leu Leu Ile |      |  |      |
|                 | 3345                |                     | 3350            |      |  | 3355 |
| Ala Glu Asp Val | Asp Ser Gln Pro     | Asn Gly Gln Ile     | His Phe Ser Ile |      |  |      |
|                 | 3365                |                     | 3370            |      |  | 3375 |
| Val Asn Gly Asp | Arg Asp Asn Glu     | Phe Thr Val Asp     | Pro Val Leu Gly |      |  |      |
|                 | 3380                |                     | 3385            |      |  | 3390 |
| Leu Val Lys Val | Lys Lys Lys Leu     | Asp Arg Glu Arg     | Val Ser Gly Tyr |      |  |      |
|                 | 3395                |                     | 3400            |      |  | 3405 |
| Ser Leu Leu Val | Gln Ala Val Asp     | Ser Gly Ile Pro     | Ala Met Ser Ser |      |  |      |
|                 | 3410                |                     | 3415            |      |  | 3420 |
| Thr Ala Thr Val | Asn Ile Asp Ile     | Ser Asp Val Asn     | Asp Asn Ser Pro |      |  |      |
|                 | 3425                |                     | 3430            |      |  | 3435 |
| Val Phe Thr Pro | Ala Asn Tyr Thr     | Ala Val Ile Gln     | Glu Asn Lys Pro |      |  |      |
|                 | 3445                |                     | 3450            |      |  | 3455 |
| Val Gly Thr Ser | Ile Leu Gln Leu     | Val Val Thr Asp     | Arg Asp Ser Phe |      |  |      |
|                 | 3460                |                     | 3465            |      |  | 3470 |
| His Asn Gly Pro | Pro Phe Ser Phe     | Ser Ile Leu Ser     | Gly Asn Glu Glu |      |  |      |
|                 | 3475                |                     | 3480            |      |  | 3485 |
| Glu Glu Phe Val | Leu Asp Pro His     | Gly Ile Leu Arg     | Ser Ala Val Val |      |  |      |
|                 | 3490                |                     | 3495            |      |  | 3500 |
| Phe Gln His Thr | Glu Ser Leu Glu     | Tyr Val Leu Cys     | Val Gln Ala Lys |      |  |      |
|                 | 3505                |                     | 3510            |      |  | 3515 |
| Asp Ser Gly Lys | Pro Gln Gln Val     | Ser His Thr Tyr     | Ile Arg Val Arg |      |  |      |
|                 | 3525                |                     | 3530            |      |  | 3535 |
| Val Ile Glu Glu | Ser Thr His Lys     | Pro Thr Ala Ile     | Pro Leu Glu Ile |      |  |      |
|                 | 3540                |                     | 3545            |      |  | 3550 |
| Phe Ile Val Thr | Met Glu Asp Asp     | Phe Pro Gly Gly     | Val Ile Gly Lys |      |  |      |
|                 | 3555                |                     | 3560            |      |  | 3565 |
| Ile His Ala Thr | Asp Gln Asp Met     | Tyr Asp Val Leu     | Thr Phe Ala Leu |      |  |      |
|                 | 3570                |                     | 3575            |      |  | 3580 |
| Lys Ser Glu Gln | Lys Ser Leu Phe     | Lys Val Asn Ser     | His Asp Gly Lys |      |  |      |
|                 | 3585                |                     | 3590            |      |  | 3595 |
| Ile Ile Ala Leu | Gly Gly Leu Asp     | Ser Gly Lys Tyr     | Val Leu Asn Val |      |  |      |
|                 | 3605                |                     | 3610            |      |  | 3615 |
| Ser Val Ser Asp | Gly Arg Phe Gln     | Val Pro Ile Asp     | Val Val Val His |      |  |      |
|                 | 3620                |                     | 3625            |      |  | 3630 |
| Val Glu Gln Leu | Val His Glu Met     | Leu Gln Asn Thr     | Val Thr Ile Arg |      |  |      |
|                 | 3635                |                     | 3640            |      |  | 3645 |
| Phe Glu Asn Val | Ser Pro Glu Asp     | Phe Val Gly Leu     | His Met His Gly |      |  |      |
|                 | 3650                |                     | 3655            |      |  | 3660 |
| Phe Arg Arg Thr | Leu Arg Asn Ala     | Val Leu Thr Gln     | Lys Gln Asp Ser |      |  |      |
|                 | 3665                |                     | 3670            |      |  | 3675 |
| Leu Arg Ile Ile | Ser Ile Gln Pro     | Val Ala Gly Thr     | Asn Gln Leu Asp |      |  |      |
|                 | 3685                |                     | 3690            |      |  | 3695 |
| Met Leu Phe Ala | Val Glu Met His     | Ser Ser Glu Phe     | Tyr Lys Pro Ala |      |  |      |
|                 | 3700                |                     | 3705            |      |  | 3710 |
| Tyr Leu Ile Gln | Lys Leu Ser Asn     | Ala Arg Arg His     | Leu Glu Asn Ile |      |  |      |



|   |   |      |
|---|---|------|
| 3715  | 3720                                    | 3725 |
| Met Arg Ile Ser Ala Ile   | Leu Glu Lys Asn Cys Ser Gly Leu Asp Cys |      |
| 3730  | 3735                                    | 3740 |
| Gln Glu Gln His Cys Glu Gln Gly Leu Ser Leu Asp Ser His Ala Leu |   |      |
| 3745  | 3750                                    | 3755 |
| Met Thr Tyr Ser Thr Ala Arg Ile Ser Phe Val Cys Pro Arg Phe Tyr |   | 3760 |
| 3765  | 3770                                    | 3775 |
| Arg Asn Val Arg Cys Thr Cys Asn Gly Gly Leu Cys Pro Gly Ser Asn |   |      |
| 3780  | 3785                                    | 3790 |
| Asp Pro Cys Val Glu Lys Pro Cys Pro Gly Asp Met Gln Cys Val Gly |   |      |
| 3795  | 3800                                    | 3805 |
| Tyr Glu Ala Ser Arg Arg Pro Phe Leu Cys Gln Cys Pro Pro Gly Lys |   |      |
| 3810  | 3815                                    | 3820 |
| Leu Gly Glu Cys Ser Gly His Thr Ser Leu Ser Phe Ala Gly Asn Ser |   |      |
| 3825  | 3830                                    | 3835 |
| Tyr Ile Lys Tyr Arg Leu Ser Glu Asn Ser Lys Glu Glu Asp Phe Lys |   | 3840 |
| 3845  | 3850                                    | 3855 |
| Leu Ala Leu Arg Leu Arg Thr Leu Gln Ser Asn Gly Ile Ile Met Tyr |   |      |
| 3860  | 3865                                    | 3870 |
| Thr Arg Ala Asn Pro Cys Ile Ile Leu Lys Ile Val Asp Gly Lys Leu |   |      |
| 3875  | 3880                                    | 3885 |
| Trp Phe Gln Leu Asp Cys Gly Ser Gly Pro Gly Ile Leu Gly Ile Ser |   |      |
| 3890  | 3895                                    | 3900 |
| Gly Arg Ala Val Asn Asp Gly Ser Trp His Ser Val Phe Leu Glu Leu |   |      |
| 3905  | 3910                                    | 3915 |
| Asn Arg Asn Phe Thr Ser Leu Ser Leu Asp Asp Ser Tyr Val Glu Arg |   | 3920 |
| 3925  | 3930                                    | 3935 |
| Arg Arg Ala Pro Leu Tyr Phe Gln Thr Leu Ser Thr Glu Ser Ser Ile |   |      |
| 3940  | 3945                                    | 3950 |
| Tyr Phe Gly Ala Leu Val Gln Ala Asp Asn Ile Arg Ser Leu Thr Asp |   |      |
| 3955  | 3960                                    | 3965 |
| Thr Arg Val Thr Gln Val Leu Ser Gly Phe Gln Gly Cys Leu Asp Ser |   |      |
| 3970  | 3975                                    | 3980 |
| Val Ile Leu Asn Asn Asn Glu Leu Pro Leu Gln Asn Lys Arg Ser Ser |   |      |
| 3985  | 3990                                    | 3995 |
| Phe Ala Glu Val Val Gly Leu Thr Glu Leu Lys Leu Gly Cys Val Leu |   |      |
| 4005  | 4010                                    | 4015 |
| Tyr Pro Asp Ala Cys Lys Arg Ser Pro Cys Gln His Gly Gly Ser Cys |   |      |
| 4020  | 4025                                    | 4030 |
| Thr Gly Leu Pro Ser Gly Gly Tyr Gln Cys Thr Cys Leu Ser Gln Phe |   |      |
| 4035  | 4040                                    | 4045 |
| Thr Gly Arg Asn Cys Glu Ser Glu Ile Thr Ala Cys Phe Pro Asn Pro |   |      |
| 4050  | 4055                                    | 4060 |
| Cys Arg Asn Gly Gly Ser Cys Asp Pro Ile Gly Asn Thr Phe Ile Cys |   |      |
| 4065  | 4070                                    | 4075 |
| Asn Cys Lys Ala Gly Leu Thr Gly Val Thr Cys Glu Glu Asp Ile Asn |   |      |
| 4085  | 4090                                    | 4095 |
| Glu Cys Glu Arg Glu Glu Cys Glu Asn Gly Gly Ser Cys Val Asn Val |   |      |
| 4100  | 4105                                    | 4110 |
| Phe Gly Ser Phe Leu Cys Asn Cys Thr Pro Gly Tyr Val Gly Gln Tyr |   |      |
| 4115  | 4120                                    | 4125 |
| Cys Gly Leu Arg Pro Val Val Val Pro Asn Ile Gln Ala Gly His Ser |   |      |
| 4130  | 4135                                    | 4140 |
| Tyr Val Gly Lys Glu Glu Leu Ile Gly Ile Ala Val Val Leu Phe Val |   |      |
| 4145  | 4150                                    | 4155 |
| Ile Phe Ile Leu Val Val Leu Phe Ile Val Phe Arg Lys Lys Val Phe |   | 4160 |

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|---|------|--|------|--|------|
|   | 4165 |  | 4170 |  | 4175 |
| Arg Lys Asn Tyr Ser Arg Asn Asn Ile Thr Leu Val Gln Asp Pro Ala |      |  |      |  |      |
|   | 4180 |  | 4185 |  | 4190 |
| Thr Ala Ala Leu Leu Asn Lys Ser Asn Gly Ile Pro Phe Arg Asn Leu |      |  |      |  |      |
|   | 4195 |  | 4200 |  | 4205 |
| Arg Gly Ser Gly Asp Gly Arg Asn Val Tyr Gln Glu Val Gly Pro Pro |      |  |      |  |      |
|   | 4210 |  | 4215 |  | 4220 |
| Gln Val Pro Val Arg Pro Met Ala Tyr Thr Pro Cys Phe Gln Ser Asp |      |  |      |  |      |
| 4225  | 4230 |  | 4235 |  | 4240 |
| Ser Arg Ser Asn Leu Asp Lys Ile Val Asp Gly Leu Gly Gly Glu His |      |  |      |  |      |
|   | 4245 |  | 4250 |  | 4255 |
| Gln Glu Met Thr Thr Phe His Pro Glu Ser Pro Arg Ile Leu Thr Ala |      |  |      |  |      |
|   | 4260 |  | 4265 |  | 4270 |
| Arg Arg Gly Val Val Val Cys Ser Val Ala Pro Asn Leu Pro Ala Val |      |  |      |  |      |
|   | 4275 |  | 4280 |  | 4285 |
| Ser Pro Cys Arg Ser Asp Cys Asp Ser Ile Arg Lys Asn Gly Trp Asp |      |  |      |  |      |
|   | 4290 |  | 4295 |  | 4300 |
| Ala Gly Thr Glu Asn Lys Gly Val Asp Asp Pro Gly Glu Val Thr Cys |      |  |      |  |      |
| 4305  | 4310 |  | 4315 |  | 4320 |
| Phe Ala Gly Ser Asn Lys Gly Ser Asn Ser Glu Val Gln Ser Leu Ser |      |  |      |  |      |
|   | 4325 |  | 4330 |  | 4335 |
| Ser Phe Gln Ser Asp Ser Gly Asp Asp Asn Ala Ser Ile Val Thr Val |      |  |      |  |      |
|   | 4340 |  | 4345 |  | 4350 |
| Ile Gln Leu Val Asn Asn Val Val Asp Thr Ile Glu Asn Glu Val Ser |      |  |      |  |      |
|   | 4355 |  | 4360 |  | 4365 |
| Val Met Asp Gln Gly Gln Asn Tyr Asn Arg Ala Tyr His Trp Asp Thr |      |  |      |  |      |
|   | 4370 |  | 4375 |  | 4380 |
| Ser Asp Trp Met Pro Gly Ala Arg Leu Ser Asp Ile Glu Glu Val Pro |      |  |      |  |      |
| 4385  | 4390 |  | 4395 |  | 4400 |
| Asn Tyr Glu Asn Gln Asp Gly Gly Ser Ala His Gln Gly Ser Thr Arg |      |  |      |  |      |
|   | 4405 |  | 4410 |  | 4415 |
| Glu Leu Glu Ser Asp Tyr Tyr Leu Gly Gly Tyr Asp Ile Asp Ser Glu |      |  |      |  |      |
|   | 4420 |  | 4425 |  | 4430 |
| Tyr Pro Pro Pro His Glu Glu Glu Phe Leu Ser Gln Asp Gln Leu Pro |      |  |      |  |      |
|   | 4435 |  | 4440 |  | 4445 |
| Pro Pro Leu Pro Glu Asp Phe Pro Asp Gln Tyr Glu Ala Leu Pro Pro |      |  |      |  |      |
|   | 4450 |  | 4455 |  | 4460 |
| Ser Gln Pro Val Ser Leu Ala Ser Thr Leu Ser Pro Asp Cys Arg Arg |      |  |      |  |      |
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| Arg Pro Gln Phe His Pro Ser Gln Tyr Leu Pro Pro His Pro Phe Pro |      |  |      |  |      |
|   | 4485 |  | 4490 |  | 4495 |
| Asn Glu Thr Asp Leu Val Gly Pro Pro Ala Ser Cys Glu Phe Ser Thr |      |  |      |  |      |
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| Phe Ala Val Ser Met Asn Gln Gly Thr Glu Pro Thr Gly Pro Ala Asp |      |  |      |  |      |
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| Ser Val Ser Leu Ser Leu His Asn Ser Arg Gly Thr Ser Ser Ser Asp |      |  |      |  |      |
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| Val Ser Ala Asn Cys Gly Phe Asp Asp Ser Glu Val Ala Met Ser Asp |      |  |      |  |      |
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| Tyr Glu Ser Val Gly Glu Leu Ser Leu Ala Ser Leu His Ile Pro Phe |      |  |      |  |      |
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<212> DNA  
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<400> 7

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 <212> PRT  
 <213> homo sapiens

<400> 8

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|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | Asp | Ile | Ile | Met | Gly | His | Cys | Val | Gly | Thr | Arg | Pro | Pro | Ala | Cys |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |     |
| Cys | Leu | Ile | Leu | Leu | Leu | Phe | Lys | Leu | Leu | Ala | Thr | Val | Ser | Gln | Gly |
|     |     | 20  |     |     |     |     |     | 25  |     |     |     |     | 30  |     |     |
| Leu | Pro | Gly | Thr | Gly | Pro | Leu | Gly | Phe | His | Phe | Thr | His | Ser | Ile | Tyr |
|     |     | 35  |     |     |     |     | 40  |     |     |     |     | 45  |     |     |     |
| Asn | Ala | Thr | Val | Tyr | Glu | Asn | Ser | Ala | Ala | Arg | Thr | Tyr | Val | Asn | Ser |
|     | 50  |     |     |     |     | 55  |     |     |     |     | 60  |     |     |     |     |
| Gln | Ser | Arg | Met | Gly | Ile | Thr | Leu | Ile | Asp | Leu | Ser | Trp | Asp | Ile | Lys |
| 65  |     |     |     |     | 70  |     |     |     |     | 75  |     |     |     | 80  |     |
| Tyr | Arg | Ile | Val | Ser | Gly | Asp | Glu | Glu | Gly | Phe | Phe | Lys | Ala | Glu | Glu |
|     |     |     | 85  |     |     |     |     |     | 90  |     |     |     |     | 95  |     |
| Val | Ile | Ile | Ala | Asp | Phe | Cys | Phe | Leu | Arg | Ile | Arg | Thr | Lys | Gly | Gly |
|     |     |     | 100 |     |     |     |     | 105 |     |     |     |     | 110 |     |     |
| Asn | Ser | Ala | Ile | Leu | Asn | Arg | Glu | Ile | Gln | Asp | Asn | Tyr | Leu | Leu | Ile |
|     |     | 115 |     |     |     |     | 120 |     |     |     |     | 125 |     |     |     |
| Val | Lys | Gly | Ser | Val | Arg | Gly | Glu | Asp | Leu | Glu | Ala | Trp | Thr | Lys | Val |
|     | 130 |     |     |     |     | 135 |     |     |     |     | 140 |     |     |     |     |
| Asn | Ile | Gln | Val | Leu | Asp | Met | Asn | Asp | Leu | Arg | Pro | Leu | Phe | Ser | Pro |
| 145 |     |     |     |     | 150 |     |     |     |     | 155 |     |     |     | 160 |     |
| Thr | Thr | Tyr | Ser | Val | Thr | Ile | Ala | Glu | Ser | Thr | Pro | Leu | Arg | Thr | Ser |
|     |     |     | 165 |     |     |     |     |     | 170 |     |     |     |     | 175 |     |
| Val | Ala | Gln | Val | Thr | Ala | Thr | Asp | Ala | Asp | Ile | Gly | Ser | Asn | Gly | Glu |
|     |     | 180 |     |     |     |     |     | 185 |     |     |     |     | 190 |     |     |
| Phe | Tyr | Tyr | Tyr | Phe | Lys | Asn | Lys | Val | Asp | Leu | Phe | Ser | Val | His | Pro |
|     | 195 |     |     |     |     | 200 |     |     |     |     |     | 205 |     |     |     |
| Thr | Ser | Gly | Val | Ile | Ser | Leu | Ser | Gly | Arg | Leu | Asn | Tyr | Asp | Glu | Lys |
|     | 210 |     |     |     |     | 215 |     |     |     |     | 220 |     |     |     |     |
| Asn | Arg | Tyr | Asp | Leu | Glu | Ile | Leu | Ala | Val | Asp | Arg | Gly | Met | Lys | Leu |
| 225 |     |     |     |     | 230 |     |     |     |     | 235 |     |     |     | 240 |     |
| Tyr | Gly | Asn | Asn | Gly | Val | Ser | Ser | Thr | Ala | Lys | Leu | Tyr | Val | His | Ile |
|     |     |     | 245 |     |     |     |     |     | 250 |     |     |     |     | 255 |     |
| Glu | Arg | Ile | Asn | Glu | His | Ala | Pro | Thr | Ile | His | Val | Val | Thr | His | Val |
|     |     |     | 260 |     |     |     |     | 265 |     |     |     |     | 270 |     |     |
| Pro | Phe | Ser | Leu | Glu | Lys | Glu | Pro | Thr | Tyr | Ala | Val | Val | Thr | Val | Asp |
|     |     | 275 |     |     |     |     | 280 |     |     |     |     | 285 |     |     |     |
| Asp | Leu | Asp | Asp | Gly | Ala | Asn | Gly | Glu | Ile | Glu | Ser | Val | Ser | Ile | Val |

|   |     |     |     |     |
|---|-----|-----|-----|-----|
| 290   |     | 295 |     | 300 |
| Ala Gly Asp Pro Leu Asp Gln Phe Phe Leu Ala Lys Glu Gly Lys Trp |     |     |     |     |
| 305   |     | 310 |     | 315 |
| Leu Asn Glu Tyr Lys Ile Lys Glu Arg Lys Gln Ile Asp Trp Glu Ser |     |     |     |     |
|   | 325 |     | 330 | 335 |
| Phe Pro Tyr Gly Tyr Asn Leu Thr Leu Gln Ala Lys Asp Lys Gly Ser |     |     |     |     |
|   | 340 |     | 345 | 350 |
| Pro Gln Lys Cys Ser Ala Leu Lys Ala Val Tyr Ile Gly Asn Pro Thr |     |     |     |     |
|   | 355 | 360 |     | 365 |
| Arg Asp Thr Val Pro Ile Arg Phe Glu Lys Glu Val Tyr Asp Val Ser |     |     |     |     |
|   | 370 | 375 |     | 380 |
| Ile Ser Glu Phe Ser Pro Pro Gly Val Val Val Ala Ile Val Lys Leu |     |     |     |     |
| 385   |     | 390 |     | 395 |
| Ser Pro Glu Pro Ile Asp Val Glu Tyr Lys Leu Ser Pro Gly Glu Asp |     |     |     |     |
|   | 405 |     | 410 | 415 |
| Ala Val Tyr Phe Lys Ile Asn Pro Arg Ser Gly Leu Ile Val Thr Ala |     |     |     |     |
|   | 420 |     | 425 | 430 |
| Arg Pro Leu Asn Thr Val Lys Lys Glu Val Tyr Lys Leu Glu Val Thr |     |     |     |     |
|   | 435 | 440 |     | 445 |
| Asn Lys Glu Gly Asp Leu Lys Ala Gln Val Thr Ile Ser Ile Glu Asp |     |     |     |     |
|   | 450 | 455 |     | 460 |
| Ala Asn Asp His Thr Pro Glu Phe Gln Gln Pro Leu Tyr Asp Ala Tyr |     |     |     |     |
| 465   |     | 470 |     | 475 |
| Val Asn Glu Ser Val Pro Val Gly Thr Ser Val Leu Thr Val Ser Ala |     |     |     |     |
|   | 485 |     | 490 | 495 |
| Ser Asp Lys Asp Lys Gly Glu Asn Gly Tyr Ile Thr Tyr Ser Ile Ala |     |     |     |     |
|   | 500 |     | 505 | 510 |
| Ser Leu Asn Leu Leu Pro Phe Val Ile Asn Gln Phe Thr Gly Val Ile |     |     |     |     |
|   | 515 |     | 520 | 525 |
| Ser Thr Thr Glu Glu Leu Asp Phe Glu Ser Ser Pro Glu Ile Tyr Arg |     |     |     |     |
|   | 530 | 535 |     | 540 |
| Phe Ile Val Arg Ala Ser Asp Trp Gly Ser Pro Tyr Arg His Glu Ser |     |     |     |     |
| 545   |     | 550 |     | 555 |
| Glu Val Asn Val Thr Ile Arg Ile Gly Asn Val Asn Asp Asn Ser Pro |     |     |     |     |
|   | 565 |     | 570 | 575 |
| Leu Phe Glu Lys Val Ala Cys Gln Gly Val Ile Ser Tyr Asp Phe Pro |     |     |     |     |
|   | 580 |     | 585 | 590 |
| Val Gly Gly His Ile Thr Ala Val Ser Ala Ile Asp Ile Asp Glu Leu |     |     |     |     |
|   | 595 | 600 |     | 605 |
| Glu Leu Val Lys Tyr Lys Ile Ile Ser Gly Asn Glu Leu Gly Phe Phe |     |     |     |     |
|   | 610 | 615 |     | 620 |
| Tyr Leu Asn Pro Asp Ser Gly Val Leu Gln Leu Lys Lys Ser Leu Thr |     |     |     |     |
| 625   |     | 630 |     | 635 |
| Asn Ser Gly Ile Lys Asn Gly Asn Phe Ala Leu Arg Ile Thr Ala Thr |     |     |     |     |
|   | 645 |     | 650 | 655 |
| Asp Gly Glu Asn Leu Ala Asp Pro Met Ser Ile Asn Ile Ser Val Leu |     |     |     |     |
|   | 660 |     | 665 | 670 |
| His Gly Lys Val Ser Ser Lys Ser Phe Ser Cys Arg Glu Thr Arg Val |     |     |     |     |
|   | 675 | 680 |     | 685 |
| Ala Gln Lys Leu Ala Glu Lys Leu Leu Ile Lys Ala Lys Ala Asn Gly |     |     |     |     |
|   | 690 | 695 |     | 700 |
| Lys Leu Asn Leu Glu Asp Gly Phe Leu Asp Phe Tyr Ser Ile Asn Arg |     |     |     |     |
| 705   |     | 710 |     | 715 |
| Gln Gly Pro Tyr Phe Asp Lys Ser Phe Pro Ser Asp Val Ala Val Lys |     |     |     |     |
|   | 725 |     | 730 | 735 |
| Glu Asp Leu Pro Val Gly Ala Asn Ile Leu Lys Ile Lys Ala Tyr Asp |     |     |     |     |



|      |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 740  |     |     |     |     |     |     |     |     |     | 745  |     |     |     |     |     |     |     |     |     | 750  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Ala  | Asp | Ser | Gly | Phe | Asn | Gly | Lys | Val | Leu | Phe  | Thr | Ile | Ser | Asp | Gly | Ala | Asp | Ser | Gly | Phe  | Asn | Gly | Lys | Val | Leu | Phe | Thr | Ile | Ser | Asp | Gly | Ala | Asp | Ser | Gly | Phe | Asn | Gly | Lys | Val | Leu | Phe | Thr | Ile | Ser | Asp | Gly |
| 755  |     |     |     |     |     |     |     |     |     | 760  |     |     |     |     |     |     |     |     |     | 765  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Asn  | Thr | Asp | Ser | Cys | Phe | Asn | Ile | Asp | Met | Glu  | Thr | Gly | Gln | Leu | Lys | Asn | Thr | Asp | Ser | Cys  | Phe | Asn | Ile | Asp | Met | Glu | Thr | Gly | Gln | Leu | Lys | Asn | Thr | Asp | Ser | Cys | Phe | Asn | Ile | Asp | Met | Glu | Thr | Gly | Gln | Leu | Lys |
| 770  |     |     |     |     |     |     |     |     |     | 775  |     |     |     |     |     |     |     |     |     | 780  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Val  | Leu | Met | Pro | Met | Asp | Arg | Glu | His | Thr | Asp  | Leu | Tyr | Leu | Leu | Asn | Val | Leu | Met | Pro | Met  | Asp | Arg | Glu | His | Thr | Asp | Leu | Tyr | Leu | Leu | Asn | Val | Leu | Met | Pro | Met | Asp | Arg | Glu | His | Thr | Asp | Leu | Tyr | Leu | Leu | Asn |
| 785  |     |     |     |     |     |     |     |     |     | 790  |     |     |     |     |     |     |     |     |     | 795  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Ile  | Thr | Ile | Tyr | Asp | Leu | Gly | Asn | Pro | Gln | Lys  | Ser | Ser | Trp | Arg | Leu | Ile | Thr | Ile | Tyr | Asp  | Leu | Gly | Asn | Pro | Gln | Lys | Ser | Ser | Trp | Arg | Leu | Ile | Thr | Ile | Tyr | Asp | Leu | Gly | Asn | Pro | Gln | Lys | Ser | Ser | Trp | Arg | Leu |
| 805  |     |     |     |     |     |     |     |     |     | 810  |     |     |     |     |     |     |     |     |     | 815  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Leu  | Thr | Ile | Asn | Val | Glu | Asp | Ala | Asn | Asp | Asn  | Ser | Pro | Val | Phe | Ile | Leu | Thr | Ile | Asn | Val  | Glu | Asp | Ala | Asn | Asp | Asn | Ser | Pro | Val | Phe | Ile | Leu | Thr | Ile | Asn | Val | Glu | Asp | Ala | Asn | Asp | Asn | Ser | Pro | Val | Phe | Ile |
| 820  |     |     |     |     |     |     |     |     |     | 825  |     |     |     |     |     |     |     |     |     | 830  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Gln  | Asp | Ser | Tyr | Ser | Val | Asn | Ile | Leu | Glu | Ser  | Ser | Gly | Ile | Gly | Thr | Gln | Asp | Ser | Tyr | Ser  | Val | Asn | Ile | Leu | Glu | Ser | Ser | Gly | Ile | Gly | Thr | Gln | Asp | Ser | Tyr | Ser | Val | Asn | Ile | Leu | Glu | Ser | Ser | Gly | Ile | Gly | Thr |
| 835  |     |     |     |     |     |     |     |     |     | 840  |     |     |     |     |     |     |     |     |     | 845  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Glu  | Ile | Ile | Gln | Val | Glu | Ala | Arg | Asp | Lys | Asp  | Leu | Gly | Ser | Asn | Gly | Glu | Ile | Ile | Gln | Val  | Glu | Ala | Arg | Asp | Lys | Asp | Leu | Gly | Ser | Asn | Gly | Glu | Ile | Ile | Gln | Val | Glu | Ala | Arg | Asp | Lys | Asp | Leu | Gly | Ser | Asn | Gly |
| 850  |     |     |     |     |     |     |     |     |     | 855  |     |     |     |     |     |     |     |     |     | 860  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Glu  | Val | Thr | Tyr | Ser | Val | Leu | Thr | Asp | Thr | Gln  | Gln | Phe | Ala | Ile | Asn | Glu | Val | Thr | Tyr | Ser  | Val | Leu | Thr | Asp | Thr | Gln | Gln | Phe | Ala | Ile | Asn | Glu | Val | Thr | Tyr | Ser | Val | Leu | Thr | Asp | Thr | Gln | Gln | Phe | Ala | Ile | Asn |
| 865  |     |     |     |     |     |     |     |     |     | 870  |     |     |     |     |     |     |     |     |     | 875  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Ser  | Ser | Thr | Gly | Ile | Val | Tyr | Val | Ala | Asp | Gln  | Leu | Asp | Arg | Glu | Ser | Ser | Ser | Thr | Gly | Ile  | Val | Tyr | Val | Ala | Asp | Gln | Leu | Asp | Arg | Glu | Ser | Ser | Ser | Thr | Gly | Ile | Val | Tyr | Val | Ala | Asp | Gln | Leu | Asp | Arg | Glu | Ser |
| 885  |     |     |     |     |     |     |     |     |     | 890  |     |     |     |     |     |     |     |     |     | 895  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Lys  | Ala | Asn | Tyr | Ser | Leu | Lys | Ile | Glu | Ala | Arg  | Asp | Lys | Ala | Glu | Ser | Lys | Ala | Asn | Tyr | Ser  | Leu | Lys | Ile | Glu | Ala | Arg | Asp | Lys | Ala | Glu | Ser | Lys | Ala | Asn | Tyr | Ser | Leu | Lys | Ile | Glu | Ala | Arg | Asp | Lys | Ala | Glu | Ser |
| 900  |     |     |     |     |     |     |     |     |     | 905  |     |     |     |     |     |     |     |     |     | 910  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Gly  | Gln | Gln | Leu | Phe | Ser | Val | Val | Thr | Leu | Lys  | Val | Phe | Leu | Asp | Asp | Gly | Gln | Gln | Leu | Phe  | Ser | Val | Val | Thr | Leu | Lys | Val | Phe | Leu | Asp | Asp | Gly | Gln | Gln | Leu | Phe | Ser | Val | Val | Thr | Leu | Lys | Val | Phe | Leu | Asp | Asp |
| 915  |     |     |     |     |     |     |     |     |     | 920  |     |     |     |     |     |     |     |     |     | 925  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Val  | Asn | Asp | Cys | Ser | Pro | Ala | Phe | Ile | Pro | Ser  | Ser | Tyr | Ser | Val | Lys | Val | Asn | Asp | Cys | Ser  | Pro | Ala | Phe | Ile | Pro | Ser | Ser | Tyr | Ser | Val | Lys | Val | Asn | Asp | Cys | Ser | Pro | Ala | Phe | Ile | Pro | Ser | Ser | Tyr | Ser | Val | Lys |
| 930  |     |     |     |     |     |     |     |     |     | 935  |     |     |     |     |     |     |     |     |     | 940  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Val  | Leu | Glu | Asp | Leu | Pro | Val | Gly | Thr | Val | Ile  | Ala | Trp | Leu | Glu | Thr | Val | Leu | Glu | Asp | Leu  | Pro | Val | Gly | Thr | Val | Ile | Ala | Trp | Leu | Glu | Thr | Val | Leu | Glu | Asp | Leu | Pro | Val | Gly | Thr | Val | Ile | Ala | Trp | Leu | Glu | Thr |
| 945  |     |     |     |     |     |     |     |     |     | 950  |     |     |     |     |     |     |     |     |     | 955  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| His  | Asp | Pro | Asp | Leu | Gly | Leu | Gly | Gly | Gln | Val  | Arg | Tyr | Ser | Leu | Val | His | Asp | Pro | Asp | Leu  | Gly | Leu | Gly | Gly | Gln | Val | Arg | Tyr | Ser | Leu | Val | His | Asp | Pro | Asp | Leu | Gly | Leu | Gly | Gly | Gln | Val | Arg | Tyr | Ser | Leu | Val |
| 965  |     |     |     |     |     |     |     |     |     | 970  |     |     |     |     |     |     |     |     |     | 975  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Asn  | Asp | Tyr | Asn | Gly | Arg | Phe | Glu | Ile | Asp | Lys  | Ala | Ser | Gly | Ala | Ile | Asn | Asp | Tyr | Asn | Gly  | Arg | Phe | Glu | Ile | Asp | Lys | Ala | Ser | Gly | Ala | Ile | Asn | Asp | Tyr | Asn | Gly | Arg | Phe | Glu | Ile | Asp | Lys | Ala | Ser | Gly | Ala | Ile |
| 980  |     |     |     |     |     |     |     |     |     | 985  |     |     |     |     |     |     |     |     |     | 990  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Arg  | Leu | Ser | Lys | Glu | Leu | Asp | Tyr | Glu | Lys | Gln  | Gln | Phe | Tyr | Asn | Leu | Arg | Leu | Ser | Lys | Glu  | Leu | Asp | Tyr | Glu | Lys | Gln | Gln | Phe | Tyr | Asn | Leu | Arg | Leu | Ser | Lys | Glu | Leu | Asp | Tyr | Glu | Lys | Gln | Gln | Phe | Tyr | Asn | Leu |
| 995  |     |     |     |     |     |     |     |     |     | 1000 |     |     |     |     |     |     |     |     |     | 1005 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Thr  | Val | Arg | Ala | Lys | Asp | Lys | Gly | Arg | Pro | Val  | Ser | Leu | Ser | Ser | Val | Thr | Val | Arg | Ala | Lys  | Asp | Lys | Gly | Arg | Pro | Val | Ser | Leu | Ser | Ser | Val | Thr | Val | Arg | Ala | Lys | Asp | Lys | Gly | Arg | Pro | Val | Ser | Leu | Ser | Ser | Val |
| 1010 |     |     |     |     |     |     |     |     |     | 1015 |     |     |     |     |     |     |     |     |     | 1020 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Ser  | Phe | Val | Glu | Val | Glu | Val | Val | Asp | Val | Asn  | Glu | Asn | Leu | His | Thr | Ser | Phe | Val | Glu | Val  | Glu | Val | Val | Asp | Val | Asn | Glu | Asn | Leu | His | Thr | Ser | Phe | Val | Glu | Val | Glu | Val | Val | Asp | Val | Asn | Glu | Asn | Leu | His | Thr |
| 1025 |     |     |     |     |     |     |     |     |     | 1030 |     |     |     |     |     |     |     |     |     | 1035 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Pro  | Tyr | Phe | Pro | Asp | Phe | Ala | Val | Val | Gly | Ser  | Val | Lys | Glu | Asn | Ser | Pro | Tyr | Phe | Pro | Asp  | Phe | Ala | Val | Val | Gly | Ser | Val | Lys | Glu | Asn | Ser | Pro | Tyr | Phe | Pro | Asp | Phe | Ala | Val | Val | Gly | Ser | Val | Lys | Glu | Asn | Ser |
| 1045 |     |     |     |     |     |     |     |     |     | 1050 |     |     |     |     |     |     |     |     |     | 1055 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Arg  | Ile | Gly | Thr | Ser | Val | Leu | Gln | Val | Thr | Ala  | Arg | Asp | Glu | Asp | Ser | Arg | Ile | Gly | Thr | Ser  | Val | Leu | Gln | Val | Thr | Ala | Arg | Asp | Glu | Asp | Ser | Arg | Ile | Gly | Thr | Ser | Val | Leu | Gln | Val | Thr | Ala | Arg | Asp | Glu | Asp | Ser |
| 1060 |     |     |     |     |     |     |     |     |     | 1065 |     |     |     |     |     |     |     |     |     | 1070 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Gly  | Arg | Asp | Gly | Glu | Ile | Gln | Tyr | Ser | Ile | Arg  | Asp | Gly | Ser | Gly | Leu | Gly | Arg | Asp | Gly | Glu  | Ile | Gln | Tyr | Ser | Ile | Arg | Asp | Gly | Ser | Gly | Leu | Gly | Arg | Asp | Gly | Glu | Ile | Gln | Tyr | Ser | Ile | Arg | Asp | Gly | Ser | Gly | Leu |
| 1075 |     |     |     |     |     |     |     |     |     | 1080 |     |     |     |     |     |     |     |     |     | 1085 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Gly  | Arg | Phe | Ser | Ile | Asp | Asp | Glu | Ser | Gly | Val  | Ile | Thr | Ala | Ala | Asp | Gly | Arg | Phe | Ser | Ile  | Asp | Asp | Glu | Ser | Gly | Val | Ile | Thr | Ala | Ala | Asp | Gly | Arg | Phe | Ser | Ile | Asp | Asp | Glu | Ser | Gly | Val | Ile | Thr | Ala | Ala | Asp |
| 1090 |     |     |     |     |     |     |     |     |     | 1095 |     |     |     |     |     |     |     |     |     | 1100 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Ile  | Leu | Asp | Arg | Glu | Thr | Met | Gly | Ser | Tyr | Trp  | Leu | Thr | Val | Tyr | Ala | Ile | Leu | Asp | Arg | Glu  | Thr | Met | Gly | Ser | Tyr | Trp | Leu | Thr | Val | Tyr | Ala | Ile | Leu | Asp | Arg | Glu | Thr | Met | Gly | Ser | Tyr | Trp | Leu | Thr | Val | Tyr | Ala |
| 1105 |     |     |     |     |     |     |     |     |     | 1110 |     |     |     |     |     |     |     |     |     | 1115 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Thr  | Asp | Arg | Gly | Val | Val | Pro | Leu | Tyr | Ser | Thr  | Ile | Glu | Val | Tyr | Ile | Thr | Asp | Arg | Gly | Val  | Val | Pro | Leu | Tyr | Ser | Thr | Ile | Glu | Val | Tyr | Ile | Thr | Asp | Arg | Gly | Val | Val | Pro | Leu | Tyr | Ser | Thr | Ile | Glu | Val | Tyr | Ile |
| 1125 |     |     |     |     |     |     |     |     |     | 1130 |     |     |     |     |     |     |     |     |     | 1135 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Glu  | Val | Glu | Asp | Val | Asn | Asp | Asn | Ala | Pro | Leu  | Thr | Ser | Glu | Pro | Ile | Glu | Val | Glu | Asp | Val  | Asn | Asp | Asn | Ala | Pro | Leu | Thr | Ser | Glu | Pro | Ile | Glu | Val | Glu | Asp | Val | Asn | Asp | Asn | Ala | Pro | Leu | Thr | Ser | Glu | Pro | Ile |
| 1140 |     |     |     |     |     |     |     |     |     | 1145 |     |     |     |     |     |     |     |     |     | 1150 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Tyr  | Tyr | Pro | Val | Val | Met | Glu | Asn | Ser | Pro | Lys  | Asp | Val | Ser | Val | Ile | Tyr | Tyr | Pro | Val | Val  | Met | Glu | Asn | Ser | Pro | Lys | Asp | Val | Ser | Val | Ile | Tyr | Tyr | Pro | Val | Val | Met | Glu | Asn | Ser | Pro | Lys | Asp | Val | Ser | Val | Ile |
| 1155 |     |     |     |     |     |     |     |     |     | 1160 |     |     |     |     |     |     |     |     |     | 1165 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Gln  | Ile | Gln | Ala | Glu | Asp | Pro | Asp | Ser | Ser | Ser  | Asn | Glu | Lys | Leu | Thr | Gln | Ile | Gln | Ala | Glu  | Asp | Pro | Asp | Ser | Ser | Ser | Asn | Glu | Lys | Leu | Thr | Gln | Ile | Gln | Ala | Glu | Asp | Pro | Asp | Ser | Ser | Ser | Asn | Glu | Lys | Leu | Thr |
| 1170 |     |     |     |     |     |     |     |     |     | 1175 |     |     |     |     |     |     |     |     |     | 1180 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Tyr  | Arg | Ile | Thr | Ser | Gly | Asn | Pro | Gln | Asn | Phe  | Phe | Ala | Ile | Asn | Ile | Tyr | Arg | Ile | Thr | Ser  | Gly | Asn | Pro | Gln | Asn | Phe | Phe | Ala | Ile | Asn | Ile | Tyr | Arg | Ile | Thr | Ser | Gly | Asn | Pro | Gln | Asn | Phe | Phe | Ala | Ile | Asn | Ile |

|   |      |      |      |
|---|------|------|------|
| 1185  | 1190 | 1195 | 1200 |
| Lys Thr Gly Leu Ile Thr Thr Thr Ser Arg Lys Leu Asp Arg Glu Gln |      |      |      |
|   | 1205 | 1210 | 1215 |
| Gln Ala Glu His Phe Leu Glu Val Thr Val Thr Asp Gly Gly Pro Ser |      |      |      |
|   | 1220 | 1225 | 1230 |
| Pro Lys Gln Ser Thr Ile Trp Val Val Val Gln Val Leu Asp Glu Asn |      |      |      |
|   | 1235 | 1240 | 1245 |
| Asp Asn Lys Pro Gln Phe Pro Glu Lys Val Tyr Gln Ile Lys Leu Pro |      |      |      |
|   | 1250 | 1255 | 1260 |
| Glu Arg Asp Arg Lys Lys Arg Gly Glu Pro Ile Tyr Arg Ala Phe Ala |      |      |      |
| 1265  | 1270 | 1275 | 1280 |
| Phe Asp Arg Asp Glu Gly Pro Asn Ala Glu Ile Ser Tyr Ser Ile Val |      |      |      |
|   | 1285 | 1290 | 1295 |
| Asp Gly Asn Asp Asp Gly Lys Phe Phe Ile Asp Pro Lys Thr Gly Met |      |      |      |
|   | 1300 | 1305 | 1310 |
| Val Ser Ser Arg Lys Gln Phe Thr Ala Gly Ser Tyr Asp Ile Leu Thr |      |      |      |
|   | 1315 | 1320 | 1325 |
| Ile Lys Ala Val Asp Asn Gly Arg Pro Gln Lys Ser Ser Thr Ala Arg |      |      |      |
|   | 1330 | 1335 | 1340 |
| Leu His Ile Glu Trp Ile Lys Lys Pro Pro Pro Ser Pro Ile Pro Leu |      |      |      |
| 1345  | 1350 | 1355 | 1360 |
| Thr Phe Asp Glu Pro Phe Tyr Asn Phe Thr Val Met Glu Ser Asp Arg |      |      |      |
|   | 1365 | 1370 | 1375 |
| Val Thr Glu Ile Val Gly Val Val Ser Val Gln Pro Ala Asn Thr Pro |      |      |      |
|   | 1380 | 1385 | 1390 |
| Leu Trp Phe Asp Ile Val Gly Gly Asn Phe Asp Ser Ala Phe Asp Ala |      |      |      |
|   | 1395 | 1400 | 1405 |
| Glu Lys Gly Val Gly Thr Ile Val Ile Ala Lys Pro Leu Asp Ala Glu |      |      |      |
|   | 1410 | 1415 | 1420 |
| Gln Arg Ser Ile Tyr Asn Met Ser Val Glu Val Thr Asp Gly Thr Asn |      |      |      |
| 1425  | 1430 | 1435 | 1440 |
| Val Ala Val Thr Gln Val Phe Ile Lys Val Leu Asp Asn Asn Asp Asn |      |      |      |
|   | 1445 | 1450 | 1455 |
| Gly Pro Glu Phe Ser Gln Pro Asn Tyr Asp Val Thr Ile Ser Glu Asp |      |      |      |
|   | 1460 | 1465 | 1470 |
| Val Leu Pro Asp Thr Glu Ile Leu Gln Ile Glu Ala Thr Asp Arg Asp |      |      |      |
|   | 1475 | 1480 | 1485 |
| Glu Lys His Lys Leu Ser Tyr Thr Val His Ser Ser Ile Asp Ser Ile |      |      |      |
|   | 1490 | 1495 | 1500 |
| Ser Met Arg Lys Phe Arg Ile Asp Pro Ser Thr Gly Val Leu Tyr Thr |      |      |      |
| 1505  | 1510 | 1515 | 1520 |
| Ala Glu Arg Leu Asp His Glu Ala Gln Asp Lys His Ile Leu Asn Ile |      |      |      |
|   | 1525 | 1530 | 1535 |
| Met Val Arg Asp Gln Glu Phe Pro Tyr Arg Arg Asn Leu Ala Arg Val |      |      |      |
|   | 1540 | 1545 | 1550 |
| Ile Val Asn Val Glu Asp Ala Asn Asp His Ser Pro Tyr Phe Thr Asn |      |      |      |
|   | 1555 | 1560 | 1565 |
| Pro Leu Tyr Glu Ala Ser Val Phe Glu Ser Ala Ala Leu Gly Ser Ala |      |      |      |
|   | 1570 | 1575 | 1580 |
| Val Leu Gln Val Thr Ala Leu Asp Lys Asp Lys Gly Glu Asn Ala Glu |      |      |      |
| 1585  | 1590 | 1595 | 1600 |
| Leu Ile Tyr Thr Ile Glu Ala Gly Asn Thr Gly Asn Met Phe Lys Ile |      |      |      |
|   | 1605 | 1610 | 1615 |
| Glu Pro Val Leu Gly Ile Ile Thr Ile Cys Lys Glu Pro Asp Met Thr |      |      |      |
|   | 1620 | 1625 | 1630 |
| Thr Met Gly Gln Phe Val Leu Ser Ile Lys Val Thr Asp Gln Gly Ser |      |      |      |

|   |   |      |
|---|---|------|
| 1635  | 1640                                    | 1645 |
| Pro Pro Met Ser Ala Thr   | Ala Ile Val Arg Ile Ser Val Thr Met Ser |      |
| 1650  | 1655                                    | 1660 |
| Asp Asn Ser His Pro Lys Phe Ile His Lys Asp Tyr Gln Ala Glu Val |   |      |
| 1665  | 1670                                    | 1675 |
| Asn Glu Asn Val Asp Ile Gly Thr Ser Val Ile Leu Ile Ser Ala Ile |   | 1680 |
|   | 1685                                    | 1690 |
| Ser Gln Ser Thr Leu Ile Tyr Glu Val Lys Asp Gly Asp Ile Asn Gly |   | 1695 |
|   | 1700                                    | 1705 |
| Ile Phe Thr Ile Asn Pro Tyr Ser Gly Val Ile Thr Thr Gln Lys Ala |   | 1710 |
|   | 1715                                    | 1720 |
| Leu Asp Tyr Glu Arg Thr Ser Ser Tyr Gln Leu Ile Ile Gln Ala Thr |   | 1725 |
|   | 1730                                    | 1735 |
| Asn Met Ala Gly Met Ala Ser Asn Ala Thr Val Asn Ile Gln Ile Val |   | 1740 |
| 1745  | 1750                                    | 1755 |
| Asp Glu Asn Asp Asn Ala Pro Val Phe Leu Phe Ser Gln Tyr Ser Gly |   | 1760 |
|   | 1765                                    | 1770 |
| Ser Leu Ser Glu Ala Ala Pro Ile Asn Ser Ile Val Arg Ser Leu Asp |   | 1775 |
|   | 1780                                    | 1785 |
| Asn Ser Pro Leu Val Ile Arg Ala Thr Asp Ala Asp Ser Asn Arg Asn |   | 1790 |
|   | 1795                                    | 1800 |
| Ala Leu Leu Val Tyr Gln Ile Val Glu Ser Thr Ala Lys Lys Phe Phe |   | 1805 |
|   | 1810                                    | 1815 |
| Thr Val Asp Ser Ser Thr Gly Ala Ile Arg Thr Ile Ala Asn Leu Asp |   | 1820 |
| 1825  | 1830                                    | 1835 |
| His Glu Thr Ile Ala His Phe His Phe His Val His Val Arg Asp Ser |   | 1840 |
|   | 1845                                    | 1850 |
| Gly Ser Pro Gln Leu Thr Ala Glu Ser Pro Val Glu Val Asn Ile Glu |   | 1855 |
|   | 1860                                    | 1865 |
| Val Thr Asp Val Asn Asp Asn Pro Pro Val Phe Thr Gln Ala Val Phe |   | 1870 |
|   | 1875                                    | 1880 |
| Glu Thr Ile Leu Leu Leu Pro Thr Tyr Val Gly Val Glu Val Leu Lys |   | 1885 |
|   | 1890                                    | 1895 |
| Val Ser Ala Thr Asp Pro Asp Ser Glu Val Pro Pro Glu Leu Thr Tyr |   | 1900 |
| 1905  | 1910                                    | 1915 |
| Ser Leu Met Glu Gly Ser Leu Asp His Phe Leu Ile Asp Ser Asn Ser |   | 1920 |
|   | 1925                                    | 1930 |
| Gly Val Leu Thr Ile Lys Asn Asn Asn Leu Ser Lys Asp His Tyr Met |   | 1935 |
|   | 1940                                    | 1945 |
| Leu Ile Val Lys Val Ser Asp Gly Lys Phe Tyr Ser Thr Ser Met Val |   | 1950 |
|   | 1955                                    | 1960 |
| Thr Ile Met Val Lys Glu Ala Met Asp Ser Gly Leu His Phe Thr Gln |   | 1965 |
|   | 1970                                    | 1975 |
| Ser Phe Tyr Ser Thr Ser Ile Ser Glu Asn Asn Thr Asn Ile Thr Lys |   | 1980 |
| 1985  | 1990                                    | 1995 |
| Val Ala Ile Val Asn Ala Val Gly Asn Arg Leu Asn Glu Pro Leu Lys |   | 2000 |
|   | 2005                                    | 2010 |
| Tyr Ser Ile Leu Asn Pro Gly Asn Lys Phe Lys Ile Lys Ser Thr Ser |   | 2015 |
|   | 2020                                    | 2025 |
| Gly Val Ile Gln Thr Thr Gly Val Pro Phe Asp Arg Glu Glu Gln Glu |   | 2030 |
|   | 2035                                    | 2040 |
| Leu Tyr Glu Leu Val Val Glu Ala Ser Arg Glu Leu Asp His Leu Arg |   | 2045 |
|   | 2050                                    | 2055 |
| Val Ala Arg Val Val Val Arg Val Asn Ile Glu Asp Ile Asn Asp Asn |   | 2060 |
| 2065  | 2070                                    | 2075 |
| Ser Pro Val Phe Val Gly Leu Pro Tyr Tyr Ala Ala Val Gln Val Asp |   | 2080 |

| 2085 |     |     |     |     |     | 2090 |     |     |     |     |     | 2095 |     |     |     |  |  |
|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|-----|------|-----|-----|-----|--|--|
| Ala  | Glu | Pro | Gly | Thr | Leu | Ile  | Tyr | Gln | Val | Thr | Ala | Ile  | Asp | Lys | Asp |  |  |
| 2100 |     |     |     |     |     | 2105 |     |     |     |     |     | 2110 |     |     |     |  |  |
| Lys  | Gly | Pro | Asn | Gly | Glu | Val  | Thr | Tyr | Val | Leu | Gln | Asp  | Asp | Tyr | Gly |  |  |
| 2115 |     |     |     |     |     | 2120 |     |     |     |     |     | 2125 |     |     |     |  |  |
| His  | Phe | Glu | Ile | Asn | Pro | Asn  | Ser | Gly | Asn | Val | Ile | Leu  | Lys | Glu | Ala |  |  |
| 2130 |     |     |     |     |     | 2135 |     |     |     |     |     | 2140 |     |     |     |  |  |
| Phe  | Asn | Ser | Asp | Leu | Ser | Asn  | Ile | Glu | Tyr | Gly | Val | Thr  | Ile | Leu | Ala |  |  |
| 2145 |     |     |     |     |     | 2150 |     |     |     |     |     | 2155 |     |     |     |  |  |
| Lys  | Asp | Gly | Gly | Lys | Pro | Ser  | Leu | Ser | Thr | Ser | Val | Glu  | Leu | Pro | Ile |  |  |
| 2165 |     |     |     |     |     | 2170 |     |     |     |     |     | 2175 |     |     |     |  |  |
| Thr  | Ile | Val | Asn | Lys | Ala | Met  | Pro | Val | Phe | Asp | Lys | Pro  | Phe | Tyr | Thr |  |  |
| 2180 |     |     |     |     |     | 2185 |     |     |     |     |     | 2190 |     |     |     |  |  |
| Ala  | Ser | Val | Asn | Glu | Asp | Ile  | Arg | Met | Asn | Thr | Pro | Ile  | Leu | Ser | Ile |  |  |
| 2195 |     |     |     |     |     | 2200 |     |     |     |     |     | 2205 |     |     |     |  |  |
| Asn  | Ala | Thr | Ser | Pro | Glu | Gly  | Gln | Gly | Ile | Ile | Tyr | Ile  | Ile | Ile | Asp |  |  |
| 2210 |     |     |     |     |     | 2215 |     |     |     |     |     | 2220 |     |     |     |  |  |
| Gly  | Asp | Pro | Phe | Lys | Gln | Phe  | Asn | Ile | Asp | Phe | Asp | Thr  | Gly | Val | Leu |  |  |
| 2225 |     |     |     |     |     | 2230 |     |     |     |     |     | 2235 |     |     |     |  |  |
| Lys  | Val | Val | Ser | Pro | Leu | Asp  | Tyr | Glu | Val | Thr | Ser | Ala  | Tyr | Lys | Leu |  |  |
| 2245 |     |     |     |     |     | 2250 |     |     |     |     |     | 2255 |     |     |     |  |  |
| Thr  | Ile | Arg | Ala | Ser | Asp | Ala  | Leu | Thr | Gly | Ala | Arg | Ala  | Glu | Val | Thr |  |  |
| 2260 |     |     |     |     |     | 2265 |     |     |     |     |     | 2270 |     |     |     |  |  |
| Val  | Asp | Leu | Leu | Val | Asn | Asp  | Val | Asn | Asp | Asn | Pro | Pro  | Ile | Phe | Asp |  |  |
| 2275 |     |     |     |     |     | 2280 |     |     |     |     |     | 2285 |     |     |     |  |  |
| Gln  | Pro | Thr | Tyr | Asn | Thr | Thr  | Leu | Ser | Glu | Ala | Ser | Leu  | Ile | Gly | Thr |  |  |
| 2290 |     |     |     |     |     | 2295 |     |     |     |     |     | 2300 |     |     |     |  |  |
| Pro  | Val | Leu | Gln | Val | Val | Ser  | Ile | Asp | Ala | Asp | Ser | Glu  | Asn | Asn | Lys |  |  |
| 2305 |     |     |     |     |     | 2310 |     |     |     |     |     | 2315 |     |     |     |  |  |
| Met  | Val | His | Tyr | Gln | Ile | Val  | Gln | Asp | Thr | Tyr | Asn | Ser  | Thr | Asp | Tyr |  |  |
| 2325 |     |     |     |     |     | 2330 |     |     |     |     |     | 2335 |     |     |     |  |  |
| Phe  | His | Ile | Asp | Ser | Ser | Ser  | Gly | Leu | Ile | Leu | Thr | Ala  | Arg | Met | Leu |  |  |
| 2340 |     |     |     |     |     | 2345 |     |     |     |     |     | 2350 |     |     |     |  |  |
| Asp  | His | Glu | Leu | Val | Gln | His  | Cys | Thr | Leu | Lys | Val | Arg  | Ser | Ile | Asp |  |  |
| 2355 |     |     |     |     |     | 2360 |     |     |     |     |     | 2365 |     |     |     |  |  |
| Ser  | Gly | Phe | Pro | Ser | Leu | Ser  | Ser | Glu | Val | Leu | Val | His  | Ile | Tyr | Ile |  |  |
| 2370 |     |     |     |     |     | 2375 |     |     |     |     |     | 2380 |     |     |     |  |  |
| Ser  | Asp | Val | Asn | Asp | Asn | Pro  | Pro | Val | Phe | Asn | Gln | Leu  | Ile | Tyr | Glu |  |  |
| 2385 |     |     |     |     |     | 2390 |     |     |     |     |     | 2395 |     |     |     |  |  |
| Ser  | Tyr | Val | Ser | Glu | Leu | Ala  | Pro | Arg | Gly | His | Phe | Val  | Thr | Cys | Val |  |  |
| 2405 |     |     |     |     |     | 2410 |     |     |     |     |     | 2415 |     |     |     |  |  |
| Gln  | Ala | Ser | Asp | Ala | Asp | Ser  | Ser | Asp | Phe | Asp | Arg | Leu  | Glu | Tyr | Ser |  |  |
| 2420 |     |     |     |     |     | 2425 |     |     |     |     |     | 2430 |     |     |     |  |  |
| Ile  | Leu | Ser | Gly | Asn | Asp | Arg  | Thr | Ser | Phe | Leu | Met | Asp  | Ser | Lys | Ser |  |  |
| 2435 |     |     |     |     |     | 2440 |     |     |     |     |     | 2445 |     |     |     |  |  |
| Gly  | Val | Ile | Thr | Leu | Ser | Asn  | His | Arg | Lys | Gln | Arg | Met  | Glu | Pro | Leu |  |  |
| 2450 |     |     |     |     |     | 2455 |     |     |     |     |     | 2460 |     |     |     |  |  |
| Tyr  | Ser | Leu | Asn | Val | Ser | Val  | Ser | Asp | Gly | Leu | Phe | Thr  | Ser | Thr | Ala |  |  |
| 2465 |     |     |     |     |     | 2470 |     |     |     |     |     | 2475 |     |     |     |  |  |
| Gln  | Val | His | Ile | Arg | Val | Leu  | Gly | Ala | Asn | Leu | Tyr | Ser  | Pro | Ala | Phe |  |  |
| 2485 |     |     |     |     |     | 2490 |     |     |     |     |     | 2495 |     |     |     |  |  |
| Ser  | Gln | Ser | Thr | Tyr | Val | Ala  | Glu | Val | Arg | Glu | Asn | Val  | Ala | Ala | Gly |  |  |
| 2500 |     |     |     |     |     | 2505 |     |     |     |     |     | 2510 |     |     |     |  |  |
| Thr  | Lys | Val | Ile | His | Val | Arg  | Ala | Thr | Asp | Gly | Asp | Pro  | Gly | Thr | Tyr |  |  |
| 2515 |     |     |     |     |     | 2520 |     |     |     |     |     | 2525 |     |     |     |  |  |
| Gly  | Gln | Ile | Ser | Tyr | Ala | Ile  | Ile | Asn | Asp | Phe | Ala | Lys  | Asp | Arg | Phe |  |  |

|   |      |      |
|---|------|------|
| 2530  | 2535 | 2540 |
| Leu Ile Asp Ser Asn Gly Gln Val Ile Thr Thr Glu Arg Leu Asp Arg |      |      |
| 2545  | 2550 | 2555 |
| Glu Asn Pro Leu Glu Gly Asp Val Ser Ile Phe Val Arg Ala Leu Asp |      | 2560 |
|   | 2565 | 2570 |
| Gly Gly Gly Arg Thr Thr Phe Cys Thr Val Arg Val Ile Val Val Asp |      | 2575 |
|   | 2580 | 2585 |
| Glu Asn Asp Asn Ala Pro Gln Phe Met Thr Val Glu Tyr Arg Ala Ser |      | 2590 |
|   | 2595 | 2600 |
| Val Arg Ala Asp Val Gly Arg Gly His Leu Val Thr Gln Val Gln Ala |      | 2605 |
|   | 2610 | 2615 |
| Ile Asp Pro Asp Asp Gly Ala Asn Ser Arg Ile Thr Tyr Ser Leu Tyr |      | 2620 |
| 2625  | 2630 | 2635 |
| Ser Glu Ala Ser Val Ser Val Ala Asp Leu Leu Glu Ile Asp Pro Asp |      | 2640 |
|   | 2645 | 2650 |
| Asn Gly Trp Met Val Thr Lys Gly Asn Phe Asn Gln Leu Lys Asn Thr |      | 2655 |
|   | 2660 | 2665 |
| Val Leu Ser Phe Phe Val Lys Ala Val Asp Gly Gly Ile Pro Val Lys |      | 2670 |
|   | 2675 | 2680 |
| His Ser Leu Ile Pro Val Tyr Ile His Val Leu Pro Pro Glu Thr Phe |      | 2685 |
|   | 2690 | 2695 |
| Leu Pro Ser Phe Thr Gln Ser Gln Tyr Ser Phe Thr Ile Ala Glu Asp |      | 2700 |
| 2705  | 2710 | 2715 |
| Thr Ala Ile Gly Ser Thr Val Asp Thr Leu Arg Ile Leu Pro Ser Gln |      | 2720 |
|   | 2725 | 2730 |
| Asn Val Trp Phe Ser Thr Val Asn Gly Glu Arg Pro Glu Asn Asn Lys |      | 2735 |
|   | 2740 | 2745 |
| Gly Gly Val Phe Val Ile Glu Gln Glu Thr Gly Thr Ile Lys Leu Asp |      | 2750 |
|   | 2755 | 2760 |
| Lys Arg Leu Asp Arg Glu Thr Ser Pro Ala Phe His Phe Lys Val Ala |      | 2765 |
|   | 2770 | 2775 |
| Ala Thr Ile Pro Leu Asp Lys Val Asp Ile Val Phe Thr Val Asp Val |      | 2780 |
| 2785  | 2790 | 2795 |
| Asp Ile Lys Val Leu Asp Leu Asn Asp Asn Lys Pro Val Phe Glu Thr |      | 2800 |
|   | 2805 | 2810 |
| Ser Ser Tyr Asp Thr Ile Ile Met Glu Gly Met Pro Val Gly Thr Lys |      | 2815 |
|   | 2820 | 2825 |
| Leu Thr Gln Val Arg Ala Ile Asp Met Asp Trp Gly Ala Asn Gly Gln |      | 2830 |
|   | 2835 | 2840 |
| Val Thr Tyr Ser Leu His Ser Asp Ser Gln Pro Glu Lys Val Met Glu |      | 2845 |
|   | 2850 | 2855 |
| Ala Phe Asn Ile Asp Ser Asn Thr Gly Trp Ile Ser Thr Leu Lys Asp |      | 2860 |
| 2865  | 2870 | 2875 |
| Leu Asp His Glu Thr Asp Pro Thr Phe Thr Phe Ser Val Val Ala Ser |      | 2880 |
|   | 2885 | 2890 |
| Asp Leu Gly Glu Ala Phe Ser Leu Ser Ser Thr Ala Leu Val Ser Val |      | 2895 |
|   | 2900 | 2905 |
| Arg Val Thr Asp Ile Asn Asp Asn Ala Pro Val Phe Ala Gln Glu Val |      | 2910 |
|   | 2915 | 2920 |
| Tyr Arg Gly Asn Val Lys Glu Ser Asp Pro Pro Gly Glu Val Val Ala |      | 2925 |
|   | 2930 | 2935 |
| Val Leu Ser Thr Trp Asp Arg Asp Thr Ser Asp Val Asn Arg Gln Val |      | 2940 |
| 2945  | 2950 | 2955 |
| Ser Tyr His Ile Thr Gly Gly Asn Pro Arg Gly Arg Phe Ala Leu Gly |      | 2960 |
|   | 2965 | 2970 |
| Leu Val Gln Ser Glu Trp Lys Val Tyr Val Lys Arg Pro Leu Asp Arg |      | 2975 |

| 2980 |     |     |     |     | 2985 |     |     |     |     | 2990 |     |     |     |     |      |  |
|------|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|-----|------|--|
| Glu  | Glu | Gln | Asp | Ile | Tyr  | Phe | Leu | Asn | Ile | Thr  | Ala | Thr | Asp | Gly | Leu  |  |
| 2995 |     |     |     |     | 3000 |     |     |     |     | 3005 |     |     |     |     |      |  |
| Phe  | Val | Thr | Gln | Ala | Met  | Val | Glu | Val | Ser | Val  | Ser | Asp | Val | Asn | Asp  |  |
| 3010 |     |     |     |     | 3015 |     |     |     |     | 3020 |     |     |     |     |      |  |
| Asn  | Ser | Pro | Val | Cys | Asp  | Gln | Val | Ala | Tyr | Thr  | Ala | Leu | Leu | Pro | Glu  |  |
| 3025 |     |     |     |     | 3030 |     |     |     |     | 3035 |     |     |     |     | 3040 |  |
| Asp  | Ile | Pro | Ser | Asn | Lys  | Ile | Ile | Leu | Lys | Val  | Ser | Ala | Lys | Asp | Ala  |  |
| 3045 |     |     |     |     | 3050 |     |     |     |     | 3055 |     |     |     |     |      |  |
| Asp  | Ile | Gly | Ser | Asn | Gly  | Tyr | Ile | Arg | Tyr | Ser  | Leu | Tyr | Gly | Ser | Gly  |  |
| 3060 |     |     |     |     | 3065 |     |     |     |     | 3070 |     |     |     |     |      |  |
| Asn  | Ser | Glu | Phe | Phe | Leu  | Asp | Pro | Glu | Ser | Gly  | Glu | Leu | Lys | Thr | Leu  |  |
| 3075 |     |     |     |     | 3080 |     |     |     |     | 3085 |     |     |     |     |      |  |
| Ala  | Leu | Leu | Asp | Arg | Glu  | Arg | Ile | Pro | Val | Tyr  | Ser | Leu | Met | Ala | Lys  |  |
| 3090 |     |     |     |     | 3095 |     |     |     |     | 3100 |     |     |     |     |      |  |
| Ala  | Thr | Asp | Gly | Gly | Gly  | Arg | Phe | Cys | Gln | Ser  | Asn | Ile | His | Leu | Ile  |  |
| 3105 |     |     |     |     | 3110 |     |     |     |     | 3115 |     |     |     |     | 3120 |  |
| Leu  | Glu | Asp | Val | Asn | Asp  | Asn | Pro | Pro | Val | Phe  | Ser | Ser | Asp | His | Tyr  |  |
| 3125 |     |     |     |     | 3130 |     |     |     |     | 3135 |     |     |     |     |      |  |
| Asn  | Thr | Cys | Val | Tyr | Glu  | Asn | Thr | Ala | Thr | Lys  | Ala | Leu | Leu | Thr | Arg  |  |
| 3140 |     |     |     |     | 3145 |     |     |     |     | 3150 |     |     |     |     |      |  |
| Val  | Gln | Ala | Val | Asp | Pro  | Asp | Ile | Gly | Ile | Asn  | Arg | Lys | Val | Val | Tyr  |  |
| 3155 |     |     |     |     | 3160 |     |     |     |     | 3165 |     |     |     |     |      |  |
| Ser  | Leu | Ala | Asp | Ser | Ala  | Gly | Gly | Val | Phe | Ser  | Ile | Asp | Ser | Ser | Ser  |  |
| 3170 |     |     |     |     | 3175 |     |     |     |     | 3180 |     |     |     |     |      |  |
| Gly  | Ile | Ile | Ile | Leu | Glu  | Gln | Pro | Leu | Asp | Arg  | Glu | Gln | Gln | Ser | Ser  |  |
| 3185 |     |     |     |     | 3190 |     |     |     |     | 3195 |     |     |     |     | 3200 |  |
| Tyr  | Asn | Ile | Ser | Val | Arg  | Ala | Thr | Asp | Gln | Ser  | Pro | Gly | Gln | Ser | Leu  |  |
| 3205 |     |     |     |     | 3210 |     |     |     |     | 3215 |     |     |     |     |      |  |
| Ser  | Ser | Leu | Thr | Thr | Val  | Thr | Ile | Thr | Val | Leu  | Asp | Ile | Asn | Asp | Asn  |  |
| 3220 |     |     |     |     | 3225 |     |     |     |     | 3230 |     |     |     |     |      |  |
| Pro  | Pro | Val | Phe | Glu | Arg  | Arg | Asp | Tyr | Leu | Val  | Thr | Val | Pro | Glu | Asp  |  |
| 3235 |     |     |     |     | 3240 |     |     |     |     | 3245 |     |     |     |     |      |  |
| Thr  | Ser | Pro | Gly | Thr | Gln  | Val | Leu | Ala | Val | Phe  | Ala | Thr | Ser | Lys | Asp  |  |
| 3250 |     |     |     |     | 3255 |     |     |     |     | 3260 |     |     |     |     |      |  |
| Ile  | Gly | Thr | Asn | Ala | Glu  | Ile | Thr | Tyr | Leu | Ile  | Arg | Ser | Gly | Asn | Glu  |  |
| 3265 |     |     |     |     | 3270 |     |     |     |     | 3275 |     |     |     |     | 3280 |  |
| Gln  | Gly | Lys | Phe | Lys | Ile  | Asn | Pro | Lys | Thr | Gly  | Gly | Ile | Ser | Val | Ser  |  |
| 3285 |     |     |     |     | 3290 |     |     |     |     | 3295 |     |     |     |     |      |  |
| Glu  | Val | Leu | Asp | Tyr | Glu  | Leu | Cys | Lys | Arg | Phe  | Tyr | Leu | Val | Val | Glu  |  |
| 3300 |     |     |     |     | 3305 |     |     |     |     | 3310 |     |     |     |     |      |  |
| Ala  | Lys | Asp | Gly | Gly | Thr  | Pro | Ala | Leu | Ser | Ala  | Val | Ala | Thr | Val | Asn  |  |
| 3315 |     |     |     |     | 3320 |     |     |     |     | 3325 |     |     |     |     |      |  |
| Ile  | Asn | Leu | Thr | Asp | Val  | Asn | Asp | Asn | Pro | Pro  | Lys | Phe | Ser | Gln | Asp  |  |
| 3330 |     |     |     |     | 3335 |     |     |     |     | 3340 |     |     |     |     |      |  |
| Val  | Tyr | Ser | Ala | Val | Ile  | Ser | Glu | Asp | Ala | Leu  | Val | Gly | Asp | Ser | Val  |  |
| 3345 |     |     |     |     | 3350 |     |     |     |     | 3355 |     |     |     |     | 3360 |  |
| Ile  | Leu | Leu | Ile | Ala | Glu  | Asp | Val | Asp | Ser | Gln  | Pro | Asn | Gly | Gln | Ile  |  |
| 3365 |     |     |     |     | 3370 |     |     |     |     | 3375 |     |     |     |     |      |  |
| His  | Phe | Ser | Ile | Val | Asn  | Gly | Asp | Arg | Asp | Asn  | Glu | Phe | Thr | Val | Asp  |  |
| 3380 |     |     |     |     | 3385 |     |     |     |     | 3390 |     |     |     |     |      |  |
| Pro  | Val | Leu | Gly | Leu | Val  | Lys | Val | Lys | Lys | Lys  | Leu | Asp | Arg | Glu | Arg  |  |
| 3395 |     |     |     |     | 3400 |     |     |     |     | 3405 |     |     |     |     |      |  |
| Val  | Ser | Gly | Tyr | Ser | Leu  | Leu | Val | Gln | Ala | Val  | Asp | Ser | Gly | Ile | Pro  |  |
| 3410 |     |     |     |     | 3415 |     |     |     |     | 3420 |     |     |     |     |      |  |
| Ala  | Met | Ser | Ser | Thr | Ala  | Thr | Val | Asn | Ile | Asp  | Ile | Ser | Asp | Val | Asn  |  |

|   |                                     |      |      |
|---|-------------------------------------|------|------|
| 3425                                    | 3430                                | 3435 | 3440 |
| Asp Asn Ser Pro Val Phe Thr             | Pro Ala Asn Tyr Thr Ala Val Ile Gln |      |      |
|   | 3445                                | 3450 | 3455 |
| Glu Asn Lys Pro Val Gly Thr Ser         | Ile Leu Gln Leu Val Val Thr Asp     |      |      |
|   | 3460                                | 3465 | 3470 |
| Arg Asp Ser Phe His Asn Gly             | Pro Phe Ser Phe Ser Ile Leu Ser     |      |      |
|   | 3475                                | 3480 | 3485 |
| Gly Asn Glu Glu Glu Phe Val Leu Asp     | Pro His Gly Ile Leu Arg             |      |      |
|   | 3490                                | 3495 | 3500 |
| Ser Ala Val Val Phe Gln His Thr Glu Ser | Leu Glu Tyr Val Leu Cys             |      |      |
| 3505                                    | 3510                                | 3515 | 3520 |
| Val Gln Ala Lys Asp Ser Gly Lys Pro     | Gln Gln Val Ser His Thr Tyr         |      |      |
|   | 3525                                | 3530 | 3535 |
| Ile Arg Val Arg Val Ile Glu Glu Ser     | Thr His Lys Pro Thr Ala Ile         |      |      |
|   | 3540                                | 3545 | 3550 |
| Pro Leu Glu Ile Phe Ile Val Thr Met     | Glu Asp Asp Phe Pro Gly Gly         |      |      |
|   | 3555                                | 3560 | 3565 |
| Val Ile Gly Lys Ile His Ala Thr Asp     | Gln Asp Met Tyr Asp Val Leu         |      |      |
|   | 3570                                | 3575 | 3580 |
| Thr Phe Ala Leu Lys Ser Glu Gln Lys Ser | Leu Phe Lys Val Asn Ser             |      |      |
| 3585                                    | 3590                                | 3595 | 3600 |
| His Asp Gly Lys Ile Ile Ala Leu Gly     | Gly Leu Asp Ser Gly Lys Tyr         |      |      |
|   | 3605                                | 3610 | 3615 |
| Val Leu Asn Val Ser Val Ser Asp Gly     | Arg Phe Gln Val Pro Ile Asp         |      |      |
|   | 3620                                | 3625 | 3630 |
| Val Val Val His Val Glu Gln Leu Val     | His Glu Met Leu Gln Asn Thr         |      |      |
|   | 3635                                | 3640 | 3645 |
| Val Thr Ile Arg Phe Glu Asn Val Ser     | Pro Glu Asp Phe Val Gly Leu         |      |      |
|   | 3650                                | 3655 | 3660 |
| His Met His Gly Phe Arg Arg Thr Leu     | Arg Asn Ala Val Leu Thr Gln         |      |      |
| 3665                                    | 3670                                | 3675 | 3680 |
| Lys Gln Asp Ser Leu Arg Ile Ile Ser     | Ile Gln Pro Val Ala Gly Thr         |      |      |
|   | 3685                                | 3690 | 3695 |
| Asn Gln Leu Asp Met Leu Phe Ala Val     | Glu Met His Ser Ser Glu Phe         |      |      |
|   | 3700                                | 3705 | 3710 |
| Tyr Lys Pro Ala Tyr Leu Ile Gln Lys     | Leu Ser Asn Ala Arg Arg His         |      |      |
|   | 3715                                | 3720 | 3725 |
| Leu Glu Asn Ile Met Arg Ile Ser Ala     | Ile Leu Glu Lys Asn Cys Ser         |      |      |
|   | 3730                                | 3735 | 3740 |
| Gly Leu Asp Cys Gln Glu Gln His Cys     | Glu Gln Gly Leu Ser Leu Asp         |      |      |
| 3745                                    | 3750                                | 3755 | 3760 |
| Ser His Ala Leu Met Thr Tyr Ser Thr     | Ala Arg Ile Ser Phe Val Cys         |      |      |
|   | 3765                                | 3770 | 3775 |
| Pro Arg Phe Tyr Arg Asn Val Arg Cys     | Thr Cys Asn Gly Gly Leu Cys         |      |      |
|   | 3780                                | 3785 | 3790 |
| Pro Gly Ser Asn Asp Pro Cys Val Glu     | Lys Pro Cys Pro Gly Asp Met         |      |      |
|   | 3795                                | 3800 | 3805 |
| Gln Cys Val Gly Tyr Glu Ala Ser Arg     | Arg Pro Phe Leu Cys Gln Cys         |      |      |
|   | 3810                                | 3815 | 3820 |
| Pro Pro Gly Lys Leu Gly Glu Cys Ser     | Gly His Thr Ser Leu Ser Phe         |      |      |
| 3825                                    | 3830                                | 3835 | 3840 |
| Ala Gly Asn Ser Tyr Ile Lys Tyr Arg     | Leu Ser Glu Asn Ser Lys Glu         |      |      |
|   | 3845                                | 3850 | 3855 |
| Glu Asp Phe Lys Leu Ala Leu Arg Leu     | Arg Thr Leu Gln Ser Asn Gly         |      |      |
|   | 3860                                | 3865 | 3870 |
| Ile Ile Met Tyr Thr Arg Ala Asn Pro     | Cys Ile Ile Leu Lys Ile Val         |      |      |

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|   |      |      |
|---|------|------|
| 3875  | 3880 | 3885 |
| Asp Gly Lys Leu Trp Phe Gln Leu Asp Cys Gly Ser Gly Pro Gly Ile |      |      |
| 3890  | 3895 | 3900 |
| Leu Gly Ile Ser Gly Arg Ala Val Asn Asp Gly Ser Trp His Ser Val |      |      |
| 3905  | 3910 | 3915 |
| Phe Leu Glu Leu Asn Arg Asn Phe Thr Ser Leu Ser Leu Asp Asp Ser |      |      |
| 3925  | 3930 | 3935 |
| Tyr Val Glu Arg Arg Ala Pro Leu Tyr Phe Gln Thr Leu Ser Thr     |      |      |
| 3940  | 3945 | 3950 |
| Glu Ser Ser Ile Tyr Phe Gly Ala Leu Val Gln Ala Asp Asn Ile Arg |      |      |
| 3955  | 3960 | 3965 |
| Ser Leu Thr Asp Thr Arg Val Thr Gln Val Leu Ser Gly Phe Gln Gly |      |      |
| 3970  | 3975 | 3980 |
| Cys Leu Asp Ser Val Ile Leu Asn Asn Asn Glu Leu Pro Leu Gln Asn |      |      |
| 3985  | 3990 | 3995 |
| Lys Arg Ser Ser Phe Ala Glu Val Val Gly Leu Thr Glu Leu Lys Leu |      |      |
| 4005  | 4010 | 4015 |
| Gly Cys Val Leu Tyr Pro Asp Ala Cys Lys Arg Ser Pro Cys Gln His |      |      |
| 4020  | 4025 | 4030 |
| Gly Gly Ser Cys Thr Gly Leu Pro Ser Gly Gly Tyr Gln Cys Thr Cys |      |      |
| 4035  | 4040 | 4045 |
| Leu Ser Gln Phe Thr Gly Arg Asn Cys Glu Ser Glu Ile Thr Ala Cys |      |      |
| 4050  | 4055 | 4060 |
| Phe Pro Asn Pro Cys Arg Asn Gly Gly Ser Cys Asp Pro Ile Gly Asn |      |      |
| 4065  | 4070 | 4075 |
| Thr Phe Ile Cys Asn Cys Lys Ala Gly Leu Thr Gly Val Thr Cys Glu |      |      |
| 4085  | 4090 | 4095 |
| Glu Asp Ile Asn Glu Cys Glu Arg Glu Glu Cys Glu Asn Gly Gly Ser |      |      |
| 4100  | 4105 | 4110 |
| Cys Val Asn Val Phe Gly Ser Phe Leu Cys Asn Cys Thr Pro Gly Tyr |      |      |
| 4115  | 4120 | 4125 |
| Val Gly Gln Tyr Cys Gly Arg Pro Val Val Val Pro Asn Ile Gln Ala |      |      |
| 4130  | 4135 | 4140 |
| Gly His Ser Tyr Val Gly Lys Glu Glu Leu Ile Gly Ile Ala Val Val |      |      |
| 4145  | 4150 | 4155 |
| Leu Phe Val Ile Phe Ile Leu Val Val Leu Phe Ile Val Phe Arg Lys |      |      |
| 4165  | 4170 | 4175 |
| Lys Val Phe Arg Lys Asn Tyr Ser Arg Asn Asn Ile Thr Leu Val Gln |      |      |
| 4180  | 4185 | 4190 |
| Asp Pro Ala Thr Ala Ala Leu Leu Asn Lys Ser Asn Gly Ile Pro Phe |      |      |
| 4195  | 4200 | 4205 |
| Arg Asn Leu Arg Gly Ser Gly Asp Gly Arg Asn Val Tyr Gln Glu Val |      |      |
| 4210  | 4215 | 4220 |
| Gly Pro Pro Gln Val Pro Val Arg Pro Met Ala Tyr Thr Pro Cys Phe |      |      |
| 4225  | 4230 | 4235 |
| Gln Ser Asp Ser Arg Ser Asn Leu Asp Lys Ile Val Asp Gly Leu Gly |      |      |
| 4245  | 4250 | 4255 |
| Gly Glu His Gln Glu Met Thr Thr Phe His Pro Glu Ser Pro Arg Ile |      |      |
| 4260  | 4265 | 4270 |
| Leu Thr Ala Arg Arg Gly Val Val Val Cys Ser Val Ala Pro Asn Leu |      |      |
| 4275  | 4280 | 4285 |
| Pro Ala Val Ser Pro Cys Arg Ser Asp Cys Asp Ser Ile Arg Lys Asn |      |      |
| 4290  | 4295 | 4300 |
| Gly Trp Asp Ala Gly Thr Glu Asn Lys Gly Val Asp Asp Pro Gly Glu |      |      |
| 4305  | 4310 | 4315 |
| Val Thr Cys Phe Ala Gly Ser Asn Lys Gly Ser Asn Ser Glu Val Gln |      |      |



|      |     |     |     |      |      |     |     |     |      |      |     |     |      |      |      |      |
|------|-----|-----|-----|------|------|-----|-----|-----|------|------|-----|-----|------|------|------|------|
|      |     |     |     | 4325 |      |     |     |     |      | 4330 |     |     |      |      |      | 4335 |
| Ser  | Leu | Ser | Ser | Phe  | Gln  | Ser | Asp | Ser | Gly  | Asp  | Asp | Asn | Ala  | Ser  | Ile  |      |
|      |     |     |     | 4340 |      |     |     |     | 4345 |      |     |     | 4350 |      |      |      |
| Val  | Thr | Val | Ile | Gln  | Leu  | Val | Asn | Asn | Val  | Val  | Asp | Thr | Ile  | Glu  | Asn  |      |
|      |     |     |     | 4355 |      |     |     |     | 4360 |      |     |     | 4365 |      |      |      |
| Glu  | Val | Ser | Val | Met  | Asp  | Gln | Gly | Gln | Asn  | Tyr  | Asn | Arg | Ala  | Tyr  | His  |      |
|      |     |     |     | 4370 |      |     |     |     | 4375 |      |     |     | 4380 |      |      |      |
| Trp  | Asp | Thr | Ser | Asp  | Trp  | Met | Pro | Gly | Ala  | Arg  | Leu | Ser | Asp  | Ile  | Glu  |      |
|      |     |     |     |      |      |     |     |     |      |      |     |     |      |      |      |      |
| 4385 |     |     |     |      | 4390 |     |     |     |      | 4395 |     |     |      |      | 4400 |      |
| Glu  | Val | Pro | Asn | Tyr  | Glu  | Asn | Gln | Asp | Gly  | Gly  | Ser | Ala | His  | Gln  | Gly  |      |
|      |     |     |     |      | 4405 |     |     |     |      | 4410 |     |     |      | 4415 |      |      |
| Ser  | Thr | Arg | Glu | Leu  | Glu  | Ser | Asp | Tyr | Tyr  | Leu  | Gly | Gly | Tyr  | Asp  | Ile  |      |
|      |     |     |     |      | 4420 |     |     |     | 4425 |      |     |     | 4430 |      |      |      |
| Asp  | Ser | Glu | Tyr | Pro  | Pro  | Pro | His | Glu | Glu  | Glu  | Phe | Leu | Ser  | Gln  | Asp  |      |
|      |     |     |     |      | 4435 |     |     |     | 4440 |      |     |     | 4445 |      |      |      |
| Gln  | Leu | Pro | Pro | Pro  | Leu  | Pro | Glu | Asp | Phe  | Pro  | Asp | Gln | Tyr  | Glu  | Ala  |      |
|      |     |     |     |      | 4450 |     |     |     | 4455 |      |     |     | 4460 |      |      |      |
| Leu  | Pro | Pro | Ser | Gln  | Pro  | Val | Ser | Leu | Ala  | Ser  | Thr | Leu | Ser  | Pro  | Asp  |      |
|      |     |     |     |      | 4465 |     |     |     | 4470 |      |     |     | 4475 |      | 4480 |      |
| Cys  | Arg | Arg | Arg | Pro  | Gln  | Phe | His | Pro | Ser  | Gln  | Tyr | Leu | Pro  | Pro  | His  |      |
|      |     |     |     |      | 4485 |     |     |     | 4490 |      |     |     | 4495 |      |      |      |
| Pro  | Phe | Pro | Asn | Glu  | Thr  | Asp | Leu | Val | Gly  | Pro  | Pro | Ala | Ser  | Cys  | Glu  |      |
|      |     |     |     |      | 4500 |     |     |     | 4505 |      |     |     | 4510 |      |      |      |
| Phe  | Ser | Thr | Phe | Ala  | Val  | Ser | Met | Asn | Gln  | Gly  | Thr | Glu | Pro  | Thr  | Gly  |      |
|      |     |     |     |      | 4515 |     |     |     | 4520 |      |     |     | 4525 |      |      |      |
| Pro  | Ala | Asp | Ser | Val  | Ser  | Leu | Ser | Leu | His  | Asn  | Ser | Arg | Gly  | Thr  | Ser  |      |
|      |     |     |     |      | 4530 |     |     |     | 4535 |      |     |     | 4540 |      |      |      |
| Ser  | Ser | Asp | Val | Ser  | Ala  | Asn | Cys | Gly | Phe  | Asp  | Asp | Ser | Glu  | Val  | Ala  |      |
|      |     |     |     |      | 4545 |     |     |     | 4550 |      |     |     | 4555 |      | 4560 |      |
| Met  | Ser | Asp | Tyr | Glu  | Ser  | Val | Gly | Glu | Leu  | Ser  | Leu | Ala | Ser  | Leu  | His  |      |
|      |     |     |     |      | 4565 |     |     |     | 4570 |      |     |     | 4575 |      |      |      |
| Ile  | Pro | Phe | Val | Glu  | Thr  | Gln | His | Gln | Thr  | Gln  | Val |     |      |      |      |      |
|      |     |     |     |      | 4580 |     |     |     | 4585 |      |     |     |      |      |      |      |